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## 5.3 The Built Environment and Providing Healthy Food Options





### 5.3.1 The Benefits of Providing Healthy Food Options

Regular physical activity needs to be accompanied by a healthy intake of food to ensure that energy 'in' is balanced with energy 'out'. This is the key to maintaining a healthy weight. This Section examines the literature on the built environment's ability to encourage healthy eating.

At the individual level, overweight, obesity and resultant health problems are the outcomes of over consumption of calories and a resultant energy imbalance. The environment in which an individual exists affects energy balance by providing opportunities for energy output through physical activity, and encouraging energy input that is within the limits of dietary recommendations.

### 5.3.2 How can the Built Environment Provide Healthy Food Options?

Food retailing has a profound effect on dietary intake. The neighbourhood is a potent predictor of dietary patterns (White 2007).

Through zoning and land use regulation, the built environment can be shaped to support or inhibit healthy eating options. In the Australian state of New South Wales, for example, many local environment plans (LEPs) limit retail floor areas so they cannot accommodate supermarkets. There are also local and State regulations that prohibit urban agriculture and community gardens, as well as ancillary uses such as the sale of fresh produce from the road side or neighbourhood stalls.

Advocates and policy makers around the world have started to address zoning impediments to healthy food access. In San Francisco (USA), when rezoning threatened neighbourhood food access, a special-use district was created to encourage the siting of a supermarket. Local government in Sacramento recently overturned a prohibition on growing food in front yards (Ashe et al. 2007). In Australia, some local governments in growth areas recognise the importance of locating supermarkets and other fresh food outlets in accessible places. Appropriate provisions

are included in strategic plans – see for example the Pottsville Locality Based Development Code cited below.

Of primary significance in the literature is that the built environment can regulate food environments around schools. The evidence emphasising the importance of school food environments is convincing. Nevertheless, the use of regulation to positively influence food environments around schools remains rare (Kestens and Daniel 2010). The US State of Arkansas was the first jurisdiction to pass legislation to combat childhood obesity. Among other interventions, including compulsory BMI measurement and provision of nutritional information to parents, the Arkansas Act 1220 of 2003 limits the placement of vending machines in and around schools. BMI levels in school children in Arkansas have not increased since the implementation of the legislation in 2004 (Raczynski et al. 2009).

In addition to the food retail environment, land use zoning and regulation can be used to influence food production systems by protecting peri-urban agricultural lands capable of producing accessible healthy food.

Finally, zoning and regulation can be employed to limit marketing and advertising infrastructure such as billboards and signs. Billboards are a relatively inexpensive method of advertising which typically has high impact in that people tend to view the same billboards regularly. The built environment can influence the use and location of billboards to advertise unhealthy food options, particularly in the vicinity of schools.

### 5.3.3 Key Studies

In the categorisation of references, 134 were identified as relating to Providing Healthy Food Options. These studies have been used to inform the major themes in this Section of the Review. Of these references, those listed below were considered by the authors to be key studies. A summary of these references has been included in the Annotated Bibliography in Appendix 3.

Ashe et al. 2007  
Burns and Inglis 2007  
Coveney and O'Dwyer 2009  
Crawford et al. 2008b  
Kestens and Daniel 2010  
Mehta and Chang 2008



Pearce et al. 2007  
 Pearce et al. 2008  
 van der Horst et al. 2007  
 Winkler et al. 2006

### 5.3.4 Major Themes in This Domain

#### Food Accessibility – Generally

**Key Message: There is a logical link between exposure to healthy food options and healthy eating. Attempts to quantify this relationship have been based on mixed methods and have produced mixed results.**

Echoing the direction of healthy built environment research, the study of food environments has shifted to an examination of contextual, structural and environmental factors influencing food choices. This includes geographical accessibility to supermarkets and fruit and vegetable stores, and the variety and price of foods within these stores (White 2007; Coveney and O'Dwyer 2009). The accessibility of healthy food is at the heart of this issue. A number of studies indicate convenience of food access as a determinant of food choice (Jilcott et al. 2009; Powell and Bao 2009). White (2007) provides a comprehensive analysis of the emergence of convenience eating.

Various studies have convincingly linked exposure to energy dense foods, often featured in convenience stores and fast-food outlets, and exposure to healthier choices offered by supermarkets<sup>5</sup>, with weight status. Dengel et al. (2009), for example, collected blood profiles, body fat percentages and blood pressure measures from 188 adolescents in Minneapolis – St Paul, USA. Individual place of residence was mapped against proximity to various destinations, including convenience stores. A consistent inverse relationship between metabolic syndrome and distance from residence to convenience store was revealed. Galvez et al. (2009) conducted a similar study on 323 children in the State of New York, USA. They were able to conclude that children living on a block with one or more convenience stores were more likely to have a higher BMI compared with children living in blocks without convenience stores. Li et al. (2009) undertook a quasi-experimental study of one year change in body weight in 1,145

adult residents from 120 neighbourhoods in Portland, USA. The study revealed that neighbourhoods with a high density of fast-food outlets were associated with increases of 1.40 kilograms in weight. Zenk et al. (2009) examined access to food stores and fruit and vegetable intake in 146 neighbourhoods within three large geographic communities of Detroit, USA. Their study revealed that presence of a large grocery store in the neighbourhood was associated with consumption of more daily fruit and vegetable servings. In a smaller sample of 102 households, Bodor et al. (2008) examined the availability of fruit and vegetables in all shops, from small corner stores to supermarkets, in a community in Louisiana, USA. They were able to quantify that greater fresh vegetable availability within 100 metres of a residence was a positive predictor of vegetable intake. Further, they found that each additional metre of shelf space dedicated to fresh vegetables was associated with 0.35 servings per day of increased intake. Similarly, Laraia et al. (2004) studied the impact of accessibility to supermarkets on the diet of 918 pregnant women in North Carolina. After controlling for individual characteristics and the location of other food outlets, the study concluded that women living greater than four miles from a supermarket were more than twice as likely to have a poor diet during pregnancy than women living within two miles of a supermarket. Using individual data from the 2002-2006 Behavioral Risk Factor Surveillance System ('BRFSS', n=714,054), Mehta and Chang (2008) linked health data with fast-food and full-service restaurant density, along with restaurant mix in counties across the USA. The study concluded that fast-food restaurant density and a higher ratio of fast-food to full-service restaurants are associated with higher individual-level weight status.

Oreskovic et al. (2009b) sampled 21,008 children aged two to 18 years from Massachusetts, USA, linking clinical data on BMI with distance to, and density of fast-food restaurants. The study found proximity to the nearest fast-food restaurant was inversely associated with BMI. Density of fast-food restaurants was positively associated with BMI. Importantly, this relationship did not persist after controlling for socio-demographic factors. The erosion of the relationship post multivariate analysis is perhaps indicative of the well researched

<sup>5</sup> Convenience stores and fast-food outlets are generally used as surrogates in studies for poor healthy food access, while the presence of a large supermarket is taken to indicate better access to healthy foods. This assumption is based on studies such as Morland et al. (2002) which found that with each additional supermarket in a census tract, fruit and vegetable intake increased. A longitudinal study by French et al. (2001) demonstrated a direct relationship between fast-food intake and weight gain over a three year period. This finding was also confirmed by an Australian based longitudinal study of women by Ball et al. (2002) which associated weight gain with fast-food consumption. A cross sectional study of 1,033 residents of Minnesota undertaken by Jeffery et al. (2006) produced similar findings.

socio-demographic stratification of overweight and obesity. The relationship of this phenomenon with the built environment is further discussed below. Other north American studies which have confirmed the link between exposure to energy dense foods through characteristics of the built environment to poor health include Hosler (2009) studying populations in rural Canada, and Dunn (2010) and Fraser et al. (2010) reviewing studies in the USA.

In contrast, Wang et al. (2007) assessed access to supermarkets for 7,595 adults in California, USA and found that having good access to chain supermarkets was actually related to a higher BMI for women. Similarly, Pearce et al. (2009) mapped travel distances to the closest fast-food outlet for all neighbourhoods against the results of a national health survey in New Zealand. The study found that residents in neighbourhoods with the furthest access to a multinational fast-food outlet were more likely to eat the recommended intake of vegetables, but also be overweight. The study concluded that better neighbourhood access to fast-food retailing is unlikely to be a driver of inequalities in diet-related health outcomes in New Zealand. The results of this study have been reiterated by recent research in Australia. As part of the Melbourne based CLAN study, Crawford et al. (2008b) examined associations between density of, and proximity to, fast-food outlets and body weight in a sample of 380 children and their parents (322 fathers and 362 mothers). Their results were almost the antithesis of the findings of many of the aforementioned US based studies. They concluded that:

'Among older children, those with at least one [fast-food] outlet within 2 kilometres had lower BMI z-scores. The further that fathers lived from an outlet, the higher their BMI. Among 13-15-year-old girls and their fathers, the likelihood of overweight/obesity was reduced by 80 percent and 50 percent, respectively, if they had at least one fast-food outlet within 2 km of their home. Among older girls, the likelihood of being overweight/obese was reduced by 14 percent with each additional outlet within 2 kilometres' (Crawford et al. 2008b p. 249).

These findings are similar to a study of 7,000 low income preschoolers in Cincinnati, USA, which found no relationship between overweight and

proximity to fast-food restaurants (Burdette and Whitaker 2004). Using a longitudinal quasi-experimental approach, Cummins et al. (2005a) examined the impact of a large retail centre in a deprived neighbourhood in Glasgow, Scotland. Adjusting for age, sex, educational attainment, and employment status, the researchers found no change in daily fruit and vegetable consumption over the 12 months following the increased exposure to food choice provided by the new retail centre. Returning to fast-food, Sturm and Datar (2005) found that fast-food restaurant density was unrelated to weight gain over four years in a nationally representative cohort of kindergarten children in the USA. Likewise, a cross-sectional study by Jeffery et al. (2006) revealed that proximity of fast-food restaurants to home and work was not associated with adults' BMI in Minnesota.

An array of methods and measures have been used to calculate the dietary and health impacts of exposure to healthy versus unhealthy foods, with an array of conclusions the only tangible result. Clearly, it is not simply exposure to fast-food that is the issue. As hypothesised by Mehta and Chang (2008), 'it is the availability of fast-food relative to other away-from-home choices that appears salient for unhealthy weight outcomes' (Mehta and Chang 2008 p. 127). The research of Mehta and Chang (2008) brings into question the relative 'demonisation' of fast-food. Many restaurants that do not meet the definition of a 'fast-food restaurant'<sup>6</sup> serve food lacking in any nutritional advantage over the offerings of traditional fast-food outlets (Ashe et al. 2007). As observed by Crawford et al. (2008b), an inverse relationship between fast-food exposure and BMI averages can be explained by the possibility that 'neighbourhoods, which have many fast-food outlets, also have many other types of food outlets where "healthier" foods are available, thus diluting the exposure to fast-foods' (Crawford et al. 2008b p. 253). Indeed, without more in depth analysis of the entire retail environment in the study area, the data collected by Crawford et al. (2008b) could be more an indication of higher densities and mixed uses within an area. Both of these urban typologies have been shown to be related to healthy weight (see for example the review of Feng et al. 2010). It is therefore important to understand the nature of what food is available in all food outlets, rather than to



<sup>6</sup> There is no standard definition for 'fast-food restaurant' followed in the literature (Jeffery et al. 2006). Australian and New Zealand studies generally use the major franchises such as McDonald's, KFC and Pizza Hut as proxy for a definition of 'fast-food restaurant' (see for example Reidpath et al. 2002).

simply quantify the number of fast-food outlets in a neighbourhood. This analysis is required before the relationship between exposure to fast-food outlets and obesity can be dismissed.

#### Sample Policy

'...to ensure that the village centre maintains its role and function as the primary active hub within the Pottsville locality, a comprehensive Structure Plan has been developed... The key components of the revised structure plan include:

- Increasing the maximum building height limit to 11 metres (allowing up to 3 storeys);
- Encourage commercial and residential uses to upper levels within the retail core;...
- Identification of a series of sites suitable for full-line supermarket development;...

Pottsville (NSW) Locality Based Development Code.

#### Sample Evidence

'The results reported here demonstrate that the restaurant environment is associated with weight status net of individual- and county-level factors. The relationship is complex, suggesting that the restaurant environment's influence goes well beyond a simple positive association between restaurant density and weight status.'

Mehta and Chang 2008 p. 131.

### Food Accessibility and Socio-Economic Status

**Key Message:** Studies have consistently shown that access to healthy food is more difficult in lower SES areas. The majority of this research has been undertaken in the USA. Detailed studies on actual accessibility to, and variety within, food environments in lower SES areas in Australia are required.

Measures of the impact of food accessibility on health often rely on the socio-economic stratification of the prevalence of

overweight and obesity (Oliver and Hayes 2005; Cummins and Macintyre 2006). In Australia, Turrell et al. (1998; 2002; 2009), Carter et al. (2007) and Miura et al. (2009) found significant relationships between SES, food shortages and likelihood to purchase foods recommended for good health. The research of Giskes et al. (2002) and Turrell et al. (2002; 2009) revealed a positive correlation between lower SES and fruit and vegetable intake. Taking a novel approach, Cummins and MacIntyre (2005b) used national level data to examine the association between neighbourhood deprivation and the density of McDonald's restaurants in 38,987 small census areas in Scotland and England. They found statistically significant positive associations between neighbourhood deprivation and the mean number of McDonald's outlets per 1,000 people. Further, these associations were linear with greater mean numbers of McDonald's outlets per 1,000 people occurring as deprivation levels increased.

Many studies explore the hypothesis that the socio-economic gradient to poor health is partly a result of healthy food being more expensive and more difficult to purchase in socio-economically deprived areas (see for example Turrell et al. 2002; Inagami et al. 2006; Jetter and Cassady 2006; Kamphuis et al. 2006; Wang et al. 2007; Hemphill et al. 2008; and Franco et al. 2009). The debate linking SES and accessibility to healthy food has subsequently informed the development of the concept of 'food deserts'. Food deserts are defined as places where 'cheap and varied food is only accessible to those who have private transport or are able to pay the costs of public transport if this is available' (Acheson 1998, p65, cited in Wrigley 2002). It is worth remembering that the costs associated with accessing healthy food inferred by this definition are conceptualised as both time and money. Smaller stores, where prices are higher and the quality of fresh food lower, are characteristic of the food choices available in areas classified as 'food deserts'. Although the actual existence of food deserts has been questioned in the literature (Cummins and Macintyre 2002; Hackett et al. 2008), a comparatively vast array of research has been undertaken attempting to quantify the relationship between the location of food outlets, SES and poor health. Dowler (2001) studied the social stratification of fruit and vegetable access. They discovered large tracts of

estates in a UK town devoid of shops selling fresh fruit and vegetables. Pouliot and Hamelin (2009) found healthy food access to be particularly lacking in rural areas in Quebec, Canada, as did Smith and Morton (2009) for communities in rural Iowa and Minnesota, USA. Larsen and Gilliland (2008) used GIS to map the emergence of food deserts over time in urban London, Canada. They concluded that residents of lower SES neighbourhoods have the poorest access to supermarkets and that inequalities in this access have increased over time.

The link between accessibility and SES in Australia was highlighted by Burns and Inglis (2007). They mapped supermarket access (as a proxy for access to a healthy diet) and fast-food outlets (as a proxy for an unhealthy diet) against measures of SES in the City of Casey – a large outer municipality in Melbourne. Results indicated that while greater than 80 percent of residents lived within an eight to ten minute car journey of a major supermarket, more advantaged areas had closer access to supermarkets and less advantaged areas had closer access to fast-food outlets. Interpolating these findings, given that people living in areas of lower SES are more likely to not have access to a car, they are therefore more likely to have even less access to healthy food. In this sense, the prevalence of poor food choice and poor accessibility combine to intensify the impact of the relationship between SES and healthy food accessibility. MacIntyre (2007) discusses and questions the efficacy of these phenomena, using the label 'deprivation amplification'. This is defined as a 'process, applying across the whole range of environmental influences on health, by which disadvantages arising from poorer quality environments (for example, lack of good public transport) amplify individual disadvantages (for example, lack of private transport) in ways which are detrimental to health' (MacIntyre 2007 p. 2).

Melbourne was also the subject of an ecological study by Reidpath et al. (2002). This project examined the relationship between an area measure of SES and the density of fast-food outlets. Pizza Hut, McDonald's, Hungry Jacks, KFC, and Red Rooster stores were mapped in 269 postal districts. The study revealed a dose-response relationship between SES and the density of fast-food outlets. People living in areas with the poorest SES had two and a half times the exposure to fast-food outlets

than people in the wealthiest category. Heading north to Brisbane, the results of a study investigating whether access to retail outlets is similar across areas of varying socio-economic disadvantage were less convincing. Winkler et al. (2006) conducted cross-sectional research assessing the shopping environments of 50 randomly sampled census collection districts. They found minimal or no socio-economic differences in shopping infrastructure available.

Again, outside of Australia, yet another twist to the SES-healthy food relationship was found by Krukowski et al. (2010). Their study employed the Nutrition Environment Measures Study-Store (NEMS-S) instrument to evaluate food stores (n=42) in Arkansas, USA. NEMS-S is a standardised observational survey to measure healthy food availability. They concluded that median household income was significantly associated with the NEMS-S healthy food availability score, regardless of food store size or type. This research suggests that even in supermarkets, healthier foods are less available in lower socio-economic areas. This finding was confirmed by Jetter and Cassidy (2006) in an interesting assessment of variations in the cost of healthy foods in different neighbourhoods in California, USA.

There are other studies which quantify the poor accessibility to healthy food, socio-economic disadvantage and overweight/obesity prevalence. See for example Morland et al. 2002; Riedpath et al. 2002; Block et al. 2004; Rose and Richards 2004; Winkler et al. 2006; Boyle et al. 2007; Hackett et al. 2008; Hemphill et al. 2008; Lovasi et al. 2009; Moore et al. 2008; Franco et al. 2009; Hurvitz et al. 2009; Larsen and Gilliland 2009; Oreskovic et al. 2009b; Powell and Bao 2009; Sharkey et al. 2009; Zick et al. 2009; Stafford et al. 2010. The vast majority of these studies found positive relationships between poor accessibility to food, low SES and reduced health status.

Most of the research was based in the USA.



### Sample Policy

#### 'Minimum WIC\* Food Stock Requirements :

Retail food vendors in counties with a population of 250,000 or more... must have in stock and available for purchase the following WIC foods...

- l) Fresh Fruits and Vegetables: Thirty pounds of WIC-allowed fresh fruits and vegetables in at least seven varieties, two of which must be bananas and carrots.'

\*The "Women's Infants and Children" program is a food stamp program initiated by the Minnesota Department of Health (USA) to increase intake of healthy foods in low income families.

### Sample Evidence

'This longitudinal study reinforces cross-sectional evidence of the importance of the neighborhood environment for the development of overweight and obesity in women...initiatives to tackle social inequalities in overweight and obesity should consider neighborhood-level barriers and opportunities to women's obesity-related behaviors to be at least as important as individual-level factors.'

Stafford et al. 2010 p. 137.

### Land Use Around Schools

**Key Message: There is convincing evidence that regulation of land use around schools can assist in reducing child and adolescent access to unhealthy food options. Nevertheless, further studies of the food environment around schools in Australia are required.**

The socio-economic gradient to the obesity epidemic also applies to children (Rosenshein and Waters 2009). Research has proposed that this relationship could be related to differential exposure to food sources in school environments. 'School food environments' are conceived as the food provided within the school (Austin et al. 2005; Neumark-Sztainer et al. 2005) as well as outlets serving foods within the vicinity of schools (Frank et al. 2006). While the built environment has little sway over the interior food environment of schools,

planning processes can, through land use zoning and regulation, influence the types of uses around educational establishments, including the density of fast-food outlets. Research has concentrated on proving a relationship between density of fast-food outlets around schools and obesity in children. Kestens and Daniel (2010) sought to examine the relationship between fast-food density around schools in low income areas. Based on the aforementioned social gradient to the childhood obesity epidemic, they hypothesised that the density of food outlets stocking calorie dense foods would be higher around schools in low income areas. Their study revealed that schools of the lowest income quartile had ten times more stores within 750 metres than schools in the highest income quartile. Eighty-one percent of schools in the most deprived areas were located within 750 metres of an outlet, compared with just 12 percent in the most affluent areas.

These findings are consistent with a Canadian study that showed higher accessibility to fast-food outlets for deprived schools (Robitaille et al. 2009 as cited in Kestens and Daniel 2010). They also concur with a Los Angeles County study that used a similar design (Simon et al. 2008). In New Zealand, both proportion of commercial land and density of fast-food outlets within 800 metres of schools were significantly positively associated with area-level deprivation. In turn this was found to be associated with childhood obesity (Pearce et al. 2007).

Taking this research beyond the association between area deprivation and obesity, Daniel et al. (2009) mapped survey data for 500,000 middle and high school students. The study, set in California (USA), found that students with fast-food restaurants within 800 metres of their schools consumed fewer servings of fruits and vegetables and drank more soft drinks. In addition, the students were more likely to be overweight or obese than were children whose schools were further from fast-food restaurants. This relationship persisted after student and school level characteristics were controlled. Further, the result was exclusive to eating at fast-food restaurants, compared with other establishments in the vicinity. The research by Daniel et al. (2009) confirms the gravity of the findings of a study which examined the concentration of fast-food restaurants in areas proximal to schools in Chicago, USA (Austin et al. 2005).



The study found that 78 percent of schools had at least one fast-food restaurant within a walkable 800 metres. Fast-food restaurants were statistically significantly clustered in areas around schools (Austin et al. 2005). Research on school environments needs to be viewed, however, in the context of the proven influence of parental intake on child consumption. For example, Van der Horst et al. (2007) completed a systematic review of environmental factors that potentially influence obesity-related dietary behaviours of children and adolescents. The conclusion was that parental intake is the strongest determinant of childhood obesity. Once again, the message is that simply changing a single element of the built environment will not necessarily result in the desired health outcome.

While built environment professionals in Australia cannot regulate the use of vending machines in the vicinity of school environments, in other countries this has been identified as an important strategy to reduce unhealthy food access for children (Ashe et al. 2007; Kestens and Daniel 2010). Soft drink contracts in schools often stipulate maximising consumption either by increasing the number of vending machines or by increasing in-school advertising (Pendergrast 2000; Wiecha et al. 2006a). In a landmark review of America's changing dietary habits, French et al. (2001) reported that soft drink consumption nearly tripled among teenage boys in the USA between 1977/1978 and 1994. Over the same period, total consumption of soft drink increased 131 percent. Redesigning vending contracts alone can therefore potentially have a substantial impact on child exposure to soft drinks.

**Sample Policy**

'Because drive-in businesses, fast-food restaurants and automobile service stations present certain unusual problems, they are hereby required to meet the following requirements ...

**Proximity to Schools, Churches, Public Recreational Areas and Residential Lots:**

No drive-in business or fast-food restaurant shall be located on a site that is within four hundred (400) feet of a public, private or parochial school, a church, a public recreation area, or any residentially zoned property.'

Section 6(D)(a), Arden Hills Zoning Ordinance, Minnesota.

**Sample Evidence**

'...school environments or routes to and from school.. offer strategic target areas for intervention.'

Kestens and Daniel 2010 p. 38.



### Farmers' Markets and Community Gardens

**Key Message: The link between exposure to community gardens and farmers' markets, with increased consumption of fresh fruit and vegetables, is obvious although difficult to quantify. Markets and gardens also facilitate community interaction and physical activity. They are an extremely valuable element of a healthy built environment.**

The community-based promotion and marketing of local agriculture has recently gained popular attention as demonstrated by the increasing numbers of farmers' markets and community gardens. Urban agriculture enables communities to access well priced fresh and healthy food, undertake physical activity (Mason and Knowd 2010; Thompson et al. 2007), as well as address issues such as climate change and food security (Macias 2008). Farmers' markets and community gardens also enable connections with the land and community members, which in turn are linked to health benefits (Teig et al. 2009; Maller et al. 2010; Pearson et al. 2010). The health benefits of farmers' markets and community gardens for physical activity and social interaction have been addressed previously in this Review (see Sections 5.1.4 and 5.2.4). The discussion below explores the direct physical health benefits of farmers' markets and community gardens in their capacity to provide healthy food options.

A review by McCormack et al. (2010) identified 16 studies on the implications of farmers' market programs and community gardens on nutrition-related outcomes in adults. Their review focused not only on the potential for markets and gardens to increase healthy food intake, but the ability of these programs to affect attitudes and beliefs about buying, preparing, and eating healthy food. While inconsistent study design was highlighted as an issue, the review found that attitudes toward increasing fruit and vegetable consumption and produce preparation were generally more positive post exposure to a farmers' market or community gardening experience. The study concludes that while it is possible that exposure to farmers' markets and community gardens may increase their long-term use, it is unknown

if this is sufficient to positively affect diet.

Complementing this work, a study by Larsen and Gilliland (2009) found that a farmers' market within a community meant competition for nearby food stores. In turn, this decreased the price of fresh fruit and vegetables over a three year period. A qualitative study in Canada by Macias (2008) examined the possibility of social stratification to the emerging popularity of organic food and farmers' markets. The study found support for organic produce came primarily from highly educated professionals. Further, access to markets was limited to the geographical areas that supported them. The research concluded that the class-based disparities to market participation highlight the need for local food projects to engage across a range of social groups and geographical locations.

Studying community gardens exclusively, Hynes and Howe (2004), Thompson et al. (2007) and Wakefield et al. (2007) used qualitative methods to explore the relationship between community gardens and increased access and intake of fruit and vegetables. Wakefield et al. (2007) reported greater access to fresh fruit and vegetables as the most often cited benefits of community gardens. This included increased intake, decreased cost, and increased variety and freshness. In an Australian context, Thompson et al. (2007) examined the role of community gardens in building healthy and sustainable communities in a large high rise public housing estate in inner Sydney. Their research documents that the harvest from community gardens was perceived to have medicinal as well as nutritional value. Further, gardeners used the opportunity to grow fresh produce otherwise not accessible in Australia (Thompson et al. 2007).

#### Sample Policy

Marrickville Council in Sydney's inner west supports five community gardens located in schools, church grounds and community areas. The gardens have been partially funded by various Council managed community grants.

Waverley Council in Sydney's eastern suburbs provides guidance and support for residents who want to plant the public nature strips along their streets with edible produce and ornamental flowers and shrubs.

**Sample Evidence**

'A ...study of 144 community gardeners in Philadelphia and 67 non-gardening controls evaluated the nutrition and economic benefits of community gardens. ...gardeners ate vegetables significantly more than comparable non-gardeners and consumed significantly fewer sweet foods and drinks and milk products...'

Hynes and Howe 2004 p. 7.

**The Built Environment and Larger Scale Food Production**

**Key Message: Urban agricultural lands play an important part in the production and supply of healthy food to urban areas in Australia and should be protected.**

The importance of preserving urban agriculture, including market gardens and farming, on the peri-urban lands around large cities is increasingly recognised in the developed world, including Australia (Paster 2004; Mason and Knowd 2010). The benefits of urban agriculture are under exploration in a variety of research fields, including agriculture, climate change, sociology, economics, planning and health (Pearson et al. 2010).

As well as supplying fresh quality produce to cities, local food production is an integral component of community building. Farmers' markets also rely on local food production. The use of viable agricultural land around Australia's cities for low density urban development has been the focus of recent attention. Many commentators and researchers are worried about how suburban development is destroying viable agricultural lands close to cities (Sinclair 2009). Sydney's metropolitan fringe produces a significant amount of perishable vegetables and poultry, leading rural planning expert Ian Sinclair (2009) to label these lands as one of the State's food bowls. The region has a suitable climate for farming, with relatively good access to water, and close proximity to a major market. However, utilising the urban fringe for agriculture poses particular difficulties for planners (Merson et al. 2010). In an effort to accommodate an ever increasing population, areas of arable land are being re-zoned for residential purposes, often

at the expense of food production (Mason and Knowd 2010). The pressures of climate change, particularly the impact on oil based transportation systems, make the preservation of productive lands in close proximity to consumers an imperative for the creation of a healthy planet able to support healthy people (Knight and Riggs 2010; Pearson et al. 2010).

**Sample Policy**

*State Environmental Planning Policy (Rural Lands) 2008*

Part 4 of this NSW planning policy has explicit provision for the protection of "state significant" agricultural lands from demand for other uses, such as housing development. State significant agricultural lands are listed in a schedule to the SEPP, however in 2010 this schedule remains blank.

**Sample Evidence**

'...it is clear that land-use planning, particularly with reference to lot sizes, subdivision and zoning objectives, is of paramount importance in maintaining agricultural land on the urban fringe.'

Merson et al. 2010 p. 80.

**The Built Environment and Mass Media Advertising**

**Key Message: In light of the comparative dearth of literature, particularly in an Australian context, on the impact of advertising signage on healthy food choices, this is an area that is under researched.**

Evidence shows that foods which are most heavily advertised are those that are over-consumed, while those that receive less advertising are under-consumed (French et al. 2001). Not surprisingly, children are particularly vulnerable to food advertising (Hastings et al. 2003; Wiecha et al. 2006b; Mehta et al 2010). The issue of advertising in and around schools is one of the environmental variables impacting obesity and overweight in children. There are New Zealand and Australian based studies suggesting that the advertising



landscape around schools is dominated by the promotion of unhealthy food (Maher et al. 2005; Kelly et al. 2008). If co-located with food outlets, unhealthy food advertising messages will generally reach students, thereby presenting an opportunity for immediate purchase of promoted items at the nearby outlets (Walton et al. 2009).

There is little scope for built environment professionals to moderate the actual content of advertising signage in Australia. However, through land use zoning and regulation, local governments can control the placement of signage. There are examples of local authorities banning advertising completely in the vicinity of schools in the USA, Canada and Brazil.

Research linking the prevalence of advertising signage for unhealthy food options and poor health is limited, particularly within an Australian context. In three cities in the USA, Hillier et al. (2009) used GIS to quantify clusters of advertising signage for fast-food outlets around schools. They were able to conclude that in lower SES areas, students were exposed to more fast-food advertising. This research relates to the work of Austin et al. (2005) which found fast-food restaurants to be statistically significantly clustered in areas around schools. Such research may well say more about the location of schools in the vicinity of commercial areas. This exposes one of the risks of encouraging mixed use and mixed density development. Nesting schools within the community hub of a commercial area is a land use practice encouraged by healthy planning guidelines such as the WA Liveable Neighbourhoods Code (Western Australian Planning Commission 2004). Care must be taken to ensure that the school environment is still protected from unnecessary exposure to advertising and retailing of unhealthy food options.

In an innovative New Zealand study, Walton et al. (2009) considered the impact of the food and advertising environment immediately around four schools on their efforts to encourage healthy eating. The researchers calculated the number of food outlets and advertisements passed by the students (n=792) on their way to these schools. School management personnel were also interviewed. The conclusion was that where children passed more outlets and

advertisements for unhealthy food, school management perceived that their efforts to improve the in-school food environment were less successful.

#### Sample Policy

##### São Paulo's Law No. 14223 - The Clean City (Brazil)

This controversial legislation passed in 2006 prohibits any type of outdoor advertising such as billboards, panels on the facades of buildings and advertising on moving vehicles within certain areas of the city.

#### Sample Evidence

'It's advertising outside the school that would prevent us from promoting [healthy nutrition more]. Go past the local dairy and it's advertised a dollar pie, and then they have got candy floss in the window and you know they are only a dollar. You put a muesli bar next to that candy floss and you know its \$2.50 for a muesli bar.'

Quote from school official as cited in Walton et al. 2009 p. 845.

### 5.3.5 Strengths and Weaknesses in the Research

This body of research suffers from similar limitations to the other domains. This includes a lack of standardised methodologies for measuring the built environment and a paucity of longitudinal studies to support causal inferences. However, research on healthy food provision is less developed than that linking the built environment and physical activity. This is evidenced by the small number of Australian studies.

The link between food accessibility, exposure, choice, SES and health is generally accepted. Nevertheless, research results are mixed and fail to indicate an enduringly consistent or quantifiable relationship. This is particularly so for environments outside the USA, as discussed in detail in Cummins and MacIntyre (2006). The mixed results prompt consideration of the possibility that there is a strong cultural attachment to the way food is purchased and consumed, compared with the way that people move and interact with their environment. The built environment's ability to provide healthy food options is potentially very sensitive to the specificities of cultural and social norms within place. Accordingly, reliance on an evidence base collated across geographical, legislative and social boundaries is particularly impractical and unhelpful. This suggests the need for qualitative, culturally relevant research which is more attuned to the idiosyncrasies that define our complex relationship with food – both its purchase and consumption. The lack of such studies is a major weakness in this domain and prevents recommendations for tangible policy development.

### 5.3.6 HBEP Opportunities for Future Research

#### Detailed, Contextual Research on the Impact of Healthy Food Accessibility on Health in Australia

Research is required on all aspects of the built environment's impact on healthy food exposure in Australia. While a number of large scale studies have been undertaken assessing availability of unhealthy food, their results need to be further explored

through detailed quantitative and qualitative analysis. Development of a body of culturally sensitive research undertaken in different cities and towns will allow more reliable generalisations to underpin policy.

An example of one such study is Coveney and O'Dwyer (2009). They used qualitative methods in their contextual analysis of food accessibility in Adelaide, Australia. They explored the concept of food deserts and the difficulties imposed by distance from home to shops for those without car access in a low density suburban environment. The study provides genuine insights into the practical implications of living within a non-walkable distance of a reasonable supermarket and not having access to private transport. Difficulties, such as catching a bus laden with shopping bags, or crossing a busy road to the supermarket with children in tow, make the implications of sprawling suburbs on healthy food availability very real. The main conclusion is that food access problems do not present as 'food deserts' defined elsewhere. In Adelaide there are not vast tracts of urban areas lacking the services of a supermarket or fruit and vegetable store as has been reported in the USA and UK. In many Australian cities, the lack of private transport can severely limit access to places selling healthy foods. It is therefore not that reasonably priced healthy food is unavailable to purchase in shops; rather the distances between these shops are too great to be accessed without a car. And while not part of Coveney and O'Dwyer's study, their work raises serious implications for people with mobility impairments gaining access to healthy food. Given the increasing realities of climate change and the already explored benefits of non-car reliance for health, the way the study looks at food access through the lens of car reliance is also pertinent. In addition, the recommendations for healthy built environments encouraging utilitarian physical activity, such as accessibility and mixed uses providing smaller distances between destinations, apply to healthy built environment strategies aimed at increasing access to healthy food.

Contextualised studies should incorporate analysis of smaller scale retail environments. Juxtaposed to large scale quantification of fast-food accessibility, detailed research is required on the kind of food choices available at all outlets. This research should include neighbourhood



coffee shops, restaurants, supermarkets, convenience and corner stores, as well as take away food shops and fast-food outlets. To undertake this kind of detailed analysis, further collaboration with health professionals is required to better understand and develop standardised measures of what is an unhealthy food environment.

#### **The Impact of Lost Urban Agricultural Land**

Further research is required on the impact of residential and other development on the urban fringe of Australian cities in relation to food supply and subsequent health. Food chains for fresh produce are relatively informal. Research is only just beginning to quantify the amount of fresh food produced in urban market gardens. This work needs to be drawn into the study of healthy built environments in the context of healthy food access, particularly across the socio-economic spectrum.

#### **The Co-Location of Food Advertising and Food Outlets**

Australian research is required on the impact of outdoor food advertising in relation to food choices for both children and adults. Investigations could include innovative collaborations with advertising and marketing professionals to better understand the way outdoor advertising is used to influence consumer behaviour. This research should focus on the way the built environment can influence the co-location of outdoor food advertising and food retail outlets in Australia. There is an opportunity to study the impact of such co-location, as well as monitor the success of attempts to limit outdoor advertising.

### **5.3.7 Policy Implications**

- The most convincing literature concerns the co-location and advertising of unhealthy food options near schools. Policies to reduce fast-food exposure in the vicinity of school environments are justified. Interestingly, this research has received global attention from an array of stakeholders and is already influencing policy making in the health insurance industry (Mohan et al. 2010).
- Given the relative dearth of research on the impact of the built environment on healthy eating options in an Australian context, it is difficult to recommend further policy change beyond that already discussed for encouraging physical activity.

### **5.3.8 Summary of Key Messages**

#### **Food Accessibility – Generally**

There is a logical link between exposure to healthy food options and healthy eating, with research suggesting that access to a supermarket or other reliable source of fresh, healthy produce will improve dietary intake. Attempts to quantify this relationship, however, have been based on mixed methods and have produced mixed results.

#### **Food Accessibility and Socio-Economic Status**

Studies have consistently shown that access to healthy food is more difficult in lower SES areas. The majority of this research has been undertaken in the USA. Detailed studies on actual accessibility to, and variety within food environments in lower SES areas in Australia are required.

#### **Land Use Around Schools**

There is convincing evidence that regulation of land use around schools can assist in reducing child and adolescent access to unhealthy food options. Nevertheless, further studies of the food environment around schools in Australia are required.

#### **Farmers' Markets and Community Gardens**

The link between exposure to community gardens and farmers' markets, with increased consumption of fresh fruit and vegetables, is obvious although difficult to quantify. Markets and gardens also facilitate community interaction and physical activity. They are an extremely valuable element of a healthy built environment.

#### **The Built Environment and Larger Scale Food Production**

Urban agricultural lands play an important part in the production and supply of healthy food to urban areas in Australia and should be protected.

#### **The Built Environment and Mass Media Advertising**

In light of the comparative dearth of literature, particularly in an Australian context, on the impact of advertising signage on healthy food choices, this is an area that is under researched.