

Planning and Building Healthy Communities

Susan Thompson¹
Emily Mitchell¹
Belinda Crawford^{2,3}

1. City Futures Research Centre, University of NSW
2. NSW Public Health Officer Training Program, NSW Ministry of Health
3. School of Public Health and Community Medicine, University of NSW

Abstract: This paper presents preliminary findings of an ongoing ARC Linkage study exploring the relationship between human health and the built environment in four diverse residential sites in NSW. The aim of the research is to understand the role the built environment plays in supporting health and well-being as part of everyday living. The focus is on how the built environment facilitates physical activity, social interaction and access to fresh and nutritious foods – all of which contribute to preventing chronic conditions such as heart disease, diabetes, depression and cancer. The first part of the paper provides a comprehensive overview of the study's research methodology, illustrating how each segment of data collection is related and in turn, informs the research questions. Observational assessments, mapping, surveys and measurements of the physical, social and food environments are core elements of the study, along with focus groups and interviews. The paper describes the development and function of the Healthy Neighbourhood Audit, which provides for the mapping of key features and infrastructure, as well as enabling the recording of detailed environmental observations about the use of space. An overview of the instruments used to record the price, availability and quality of foods in the subject sites is also provided. We discuss selected outcomes of both neighbourhood audits and food environment assessments, showing how data collection currently underway will further augment these findings. This research, involving partners from the health and built environment sectors, is contributing to our understanding of the complex and contextual nature of supportive environments for healthy living.

Introduction

Physical inactivity, social isolation and poor nutrition are three of the key risk factors for chronic conditions such as diabetes, heart disease, depression and some cancers (AIHW, 2012; Kent et al, 2011; Daar et al, 2007). There is a significant body of evidence relating to the relationship between these risk factors and the built environment. The research indicates that the planning and design of buildings, streets, transport systems, neighbourhoods and cities have a profound influence on the choices people make in their everyday lives in relation to bodily movement, social connection and nourishment, which in turn affect their health and well-being (see for example, Dannenberg et al, 2011; Kent et al, 2011; Corburn, 2009; Mead et al, 2006; Frumkin et al, 2004; Barton and Tsourou, 2000).

This paper provides a detailed description of an ongoing Australian Research Council (ARC) funded study exploring the relationship between human health and the built environment in four diverse residential sites in NSW. The aim of the project is to understand the role different physical and other less tangible elements of the built environment play in supporting health and well-being as part of everyday living. The focus is on collecting a variety of different types of qualitative data to provide a deeper understanding of how the places where we live facilitate physical activity, social interaction and access to fresh and nutritious foods.

The comprehensive research approach, together with the specific methods used, is described in detail. This includes the development and application of our Healthy Neighbourhood Audit Instrument; the approach to reporting the results of the neighbourhood audits; assessment and analysis of the food environments; and the composition of individual interview and focus group questions. Selected results are discussed in the final section of the paper to illustrate the breadth and complexity of the findings, the challenges in synthesising them, as well as how interviews and focus groups, currently underway, will inform the final stages of this research project.

Research Background

There is global concern about rising rates of serious chronic physical and psychological conditions in urban populations. Many of these diseases are exacerbated by obesity and low levels of physical activity. In Australia only 43% of adults met the National Physical Activity Guidelines in 2011-12.

Further, rates of physical activity trended downwards while sedentary behaviour increased (ABS, 2013a). At the same time, only 5.5% of Australian adults were found to consume the daily recommended amounts of fruit and vegetables, while significant numbers of children failed to satisfy nutritional requirements (ABS, 2013b). Australia has one of the highest rates of obesity in the world, and the rate is increasing (ABS, 2013a; AIHW, 2012, p. x). In 2011-12, 62.8% of Australians over the age of 17 years and 25.1% of children were overweight or obese (ABS, 2013c). This is of particular concern as overweight in childhood is frequently carried into adulthood (Brisbois et al, 2012; Singh et al, 2008).

Medical interventions are limited in tackling these health issues because they are related to a variety of complex factors (Dixon and Broom, 2007). Urban living is seen as an increasing impediment to healthy living. Built environments characterised by segregated land uses, disconnected and convoluted street patterns, low residential densities, limited public transport availability, and inadequate opportunities for local employment promote motor vehicle dependency. These environments also discourage physical activity and make healthy food choices difficult (Dannenberg et al, 2011; Kent et al, 2011; Thompson, 2007; Mead et al, 2006; Frumkin et al, 2004; Barton and Tsourou, 2000). Conversely, built environments characterised by mixed land uses, connectivity of both streets and transport networks, a variety of residential and commercial densities, together with infrastructure that is designed to facilitate active transport such as cycling and walking, encourage physical activity and allow access to a diversity of goods and services, including healthy food. In turn, these qualities result in positive contributions to physical and mental health, the latter associated with feeling safe and socially connected within one's neighbourhood (Dannenberg et al, 2011; Kent et al, 2011; Mead et al, 2006; Frumkin et al, 2004; Barton and Tsourou, 2000).

Although the relationship between health and the built environment is strong, it is complex and highly contextual. Consequently, further research is needed to understand how best to plan and design neighbourhoods that support and enhance active living, social interaction and access to healthy food sources (Kent et al, 2011, p. 105). Our research makes a contribution to this endeavour. It builds on the existing body of knowledge around health and the built environment in Australia, taking into account the complexity of context. It provides a deeper understanding of the different ways people navigate through and make sense of their environments, and the resultant connections between people, place, and health outcomes.

Project Description

Entitled *Planning and Building Healthy Communities*, the project commenced in 2011 and is being undertaken in partnership with built environment and health organisations – UrbanGrowth NSW (formerly Landcom), South Western Sydney Local Health District and the National Heart Foundation. The central aim of the research is to understand how diverse residential neighbourhoods with a range of healthy planning design features, different housing densities, varied commercial, open space and transport provision, and in different metropolitan and fringe localities, support human physical and mental health. The study addresses the following questions:

- Who is attracted to the development?
- What are the motivations of residents in deciding to live in a particular development?
- What is the health status of residents over time – when they move into the development (or at the start of the study) and after they have lived there for some time?
- What features of the development make it easy/difficult for residents to be mentally healthy?
- What features of the development make it easy/difficult for residents to be physically active in their everyday lives?
- What features of the development make it easy/difficult for residents to access healthy food, public transport, community facilities and services which are linked to good health outcomes?

The chosen case study sites are Victoria Park (located in the inner city suburb of Zetland, south east of the Sydney CBD); Airds Bradbury (a public housing estate in Sydney's suburban south west undergoing redevelopment); Rouse Hill (located in Sydney's suburban north west); and Renwick (situated in the Southern Highlands of NSW, approximately 100km south of Sydney). UrbanGrowth NSW played a role in the planning, development and redevelopment of each site, including working with the National Heart Foundation to incorporate some of the principles of the 'Healthy by Design' Guidelines (National Heart Foundation, 2004) in the master plan for Renwick. The sites are at different points of completion in the development cycle, and have varying population characteristics, residential

densities and locational attributes. These neighbourhoods were selected for the study as they represent a continuum of interventions for human health – from comprehensive incorporation of healthy built environment principles (Renwick), through inclusion of some key design features (Rouse Hill and Airds Bradbury) to no particular conscious integration of healthy design features (Victoria Park). The sites also accommodate people with a range of socio-economic characteristics.

Methodology

We now turn to the methodology – that is, the principles underlying our research approach (Dew, 2007 in Liamputtong, 2009, p.3). Despite the many studies in this area, proof of a direct causal link between the built environment and health outcomes remains elusive. This is related to both the type of evidence able to be collected across the built environment and health disciplines, and the way in which the vast majority of studies have been conducted. The type of evidence that one can collect has to bridge the deep philosophical divide, as well as disparate traditions of practice and research, in built environment and health/medical scholarship. In social science investigations, unlike the scientific laboratory, it is impossible to isolate variables in double-blind procedures given their real-world settings (Burke et al, 2008, pp. 25). Consequently, there has been much debate on how research can best be conducted in this inter-disciplinary arena, particularly accounting for the complexity of people-place interconnections (Dannenberg et al, 2011; Barton, 2007, p. 10). The intricacy of the urban planning process itself is a further complicating factor.

In addition, it is arguable that even if it were possible to isolate variables of interest, a simple ‘proof’ does not necessarily lead to in-depth and comprehensive understandings of people-place relationships. Understanding the relationship between physical place and human interaction has been a long-time passion of urban planners and related professionals including urban sociologists (Whyte, 1980), geographers (Tuan, 1977; Relph, 1976) and designers/place makers (Jan Gehl writing in Danish in the 1970s and then translated into English in 1987). Detailed observations of the everyday actions of people in familiar and ordinary places are hallmarks of their work. This has enabled an appreciation of the complexities of spatial qualities and human interaction in all their diversity, complexity and messiness. Jane Jacobs (1961) observed the use of New York neighbourhoods in her ground breaking development of principles to create people centered cities – ones where safety, walkability, sense of belonging and vibrant street life are prioritised over and above car dominated and socially isolating urban environments. Theories of place and place making, using detailed observations of ordinary, every-day localities, have also been linked to environmental and human health (Eyles and Williams, 2008). Jan Gehl, extending his earlier work, reinforced the importance of detailed observations of city life, enabling in-depth insights into the nature of urban spaces, how people move within and use them, and how place supports human health and well-being (Gehl, 2010; Gehl et al., 2006).

Building upon this methodological approach, together with the objective of achieving a comprehensive and in-depth understanding of how our study sites support people being healthy as part of everyday living, we determined that the most effective research approach was a mix of qualitative and quantitative data collection. Termed ‘triangulation’, this is where researchers ‘make use of multiple and different sources, methods, investigators, and theories, to provide corroborating evidence’ (Creswell, 2013, p. 251). We now describe the methods, or processes by which data is collected (Dew 2007 in Liamputtong, 2009, p.3), used in the study to understand how the environment supports physical activity, and access to healthy food, public transport and community facilities and services.

Methods

Healthy Neighbourhood Audit

There is an array of measures to assess the relationship between the built environment and health. These include accelerometers, surveys and questionnaires, geographic information systems (GIS) analysis, walkability assessments and site audits. The majority of these instruments explore the relationship between neighbourhood design and utilitarian or leisure time physical activity, while there are also a number of tools that allow for assessment of social and food environments (Wong, 2011; Schaefer-McDaniel, 2010; Pikora et al, 2002). Few methods, however, have been designed to explore the impact of a particular neighbourhood in its entirety embracing human physical activity, social interaction and healthy food access. The Healthy Neighbourhood Audit (HNA) developed for this project is an attempt to do just this. Grounded in observational urban planning practice and theory, it provides a holistic overview of the critical determinants of health in the built environment. The instrument allows for an assessment and exploration of neighbourhood context and design through

mapping of land uses and key features, infrastructure and design elements. It also records detailed environmental observations such as the use of, and movement through, different spaces; perceptions of safety; and the availability of different types of food – from both traditional sources (such as supermarkets) and alternative (such as community gardens). For a full description of the HNA developed for this research see Mitchell and Thompson (2013).

The HNA was used in each study site, during the working week and on weekends, in daylight and at night. This enabled accommodation of the impact of temporal context. Each audit was primarily undertaken on foot, and complemented by additional windshield observations and use of existing GIS data. The audits were completed by a team of interdisciplinary auditors, incorporating skills in urban planning, GIS and public health. Data was collected on land uses, street networks and infrastructure and entered while in the field into a GIS application on an iPad. In addition, detailed observations were recorded via note taking on a paper copy of the HNA Instrument. Each site was recorded photographically with images linked to the GIS map. Auditors were trained to use the HNA prior to commencing the field work which occurred over 14 months during 2012-13.

Community Food Assessment

Access to an affordable, fresh and nutritious food supply is a key determinant of health. The combination of reduced affordability of fresh foods and perceived lower cost of energy dense, nutrient poor convenience foods contributes to unhealthy food choices, particularly for low socio-economic-status (SES) groups (Burns and Friel, 2007; Burns, 2004). In the US in particular, there is evidence that some neighbourhoods have become ‘food deserts’ – typically defined as low income, minority dominated urban neighbourhoods which have a dearth of supermarkets and grocery stores, and thus a lack of reasonably priced and varied healthy food choices (Larsen and Gilliland, 2009: 1158; see also Krukowski et al, 2010; Inagami et al, 2006; Jetter and Cassady, 2006). At the same time, there are a number of studies that contradict the food desert theory (Ball et al, 2009; Giskes et al, 2002). Some researchers have found little difference between low and high SES areas in relation to access, price and variety of fruits and vegetables. Indeed, some studies have found that fruits and vegetables are less pricey in low SES neighbourhoods, although geographical access can be better in higher SES areas (Ball et al., 2009). According to Ball et al, the variation in findings can be attributed in part to differences in methodologies and indicators used to assess the food environment (2009: 584). An Australian study of food deserts found that the relationship between SES and store accessibility was non-linear, with the most supermarkets in middle-income areas, although low SES areas tended to be closer to a major supermarket (Winkler et al., 2006). It is clear that the notion of ‘food deserts’ is complex and requires more in-depth investigation. It is our belief that the use of a combination of quantitative and qualitative methods to interrogate this issue will provide such depth.

In order to investigate access to healthy food in the case study sites, both the HNA and two specially developed tools were used. In this section we describe these assessment tools – one focused on food from supermarkets, while the other examined farmers’ markets. Questions about access to fresh fruits and vegetables, and use of alternative food sources, have been included in the question schedules for interviews and focus groups. This qualitative element of the community food assessment is described further below.

The supermarket tool was a market basket survey. This involved collecting information on the cost of staple food items, together with availability and quality of fresh fruit and vegetables. Food costs were recorded using the Victorian Healthy Food Basket Survey (Palermo and Wilson, 2007), while the availability and quality of fresh fruit and vegetables was assessed using the Queensland Healthy Food Access Basket (Queensland Health, 2002). We included the two major Australian supermarket chain stores, a large discount supermarket chain and independent grocery stores in the survey.

The farmers’ market tool focused on assessing available produce and the factors that motivate customers and stallholders to attend the markets. The research team developed a checklist to assess the cost, availability and visual quality of fresh fruit and vegetables. Diversity of produce, availability of gourmet items, and the presence of locally grown and/or organic food were also recorded. A short questionnaire was undertaken to assess customer and stallholder perceptions of the farmers’ markets, including the importance of buying local, fresh, high quality and/or organic produce, as well as building relationships and supporting a community event.

The food assessment tools were pilot tested and data collectors underwent training to ensure accurate and consistent ratings. The market basket survey was completed within a two week period during October 2012. This minimised the potential for seasonal variation in the price and quality of foods,

especially fruits and vegetables. The farmers' market research was undertaken from February to April 2013.

Interviews and Focus Groups

Augmenting the detailed HNA and food assessments are individual interviews and focus groups. The data collected from this phase of the research will provide the clearest opportunity to explore the different ways people navigate through and make sense of their environments, and the meanings behind the everyday behaviours that contribute to their health and wellbeing.

Designing the question schedule (see Table 1) for the interviews was a collaborative process involving the entire research team and project partners. A number of questions were adapted from existing questionnaires including elements of the Neighbourhood Physical Activity Questionnaire developed for the RESIDE project (Giles-Corti et al, 2006); The Selandra Rise Neighbourhood Health and Wellbeing Survey (Maller and Nicholls, 2012); the Green Square Snapshot Survey (City Futures Research Centre, 2013); and the NSW Adult Population Health Survey (NSW Ministry of Health, 2011). New questions were developed to cover additional topic areas. Importantly, we used our in-depth understanding of the environmental context derived from the detailed HNAs and healthy food assessments as part of this process.

The connections between the interviews and focus groups, and the data collected through the neighbourhood audits and community food assessments, are described further in 'Selected Findings'.

Table 1: Question schedule sections and topics

Section	Question Topics
Your Neighbourhood	<ul style="list-style-type: none"> • Features of the environment that are important for keeping healthy • Level of satisfaction with services, infrastructure and other elements of the neighbourhood
Being Active	<ul style="list-style-type: none"> • Utilitarian and recreational physical activities • Settings in which people engage in physical activities • Modes of transport used to access sports facilities, green and open spaces and other relevant localities
Your Community	<ul style="list-style-type: none"> • Relationships between neighbours and the larger community • Social capital • Level of interaction between neighbours • Places for socialisation and chance meetings • Levels of engagement in social and community activities
Your Food	<ul style="list-style-type: none"> • Frequency of fresh fruit and vegetable purchases • Modes of transport used to access food sources • Levels of engagement with alternative food sources such as farmers' markets, community gardens and private edible gardens
Your Health	<ul style="list-style-type: none"> • Physical and mental health ratings • Changes in health status since moving to current location • Basic demographic data

Selected Findings

We now present selected findings from the HNAs and food assessment tools, and show how interview and focus groups will augment this work. We also demonstrate how detailed data are being synthesised and reported, as well as how these study outcomes can inform ongoing data collection.

Audit Reports

The results of the audits are currently being collated in separate Healthy Neighbourhood Audit Reports for each site. The information presented in each Audit Report is a record of the site at the time of data collection. The findings are detailed and rich, emerging from over 60 hours of observations, assessments and mapping. Representing this data in a way that is useful, yet reflective of its depth and diversity, presents a substantial challenge. There is a need to present a meaningful assessment of the health-related elements of each environment, as well as acknowledging the complexity of the sites.

In light of this complexity, a range of formats have been used to report different variables. This flexibility enables a clear demonstration of the depth and diversity of data collected, allowing each site to be presented in its unique and dynamic context. We consider this a prerequisite for accuracy in reporting of the results of studies that embrace both subjective and objective interpretations. Accordingly, the findings are presented as an amalgam of maps, photographs and descriptive text. Each report comprises observations (such as the presence and type of certain physical features), subjective assessments of the quality of physical elements (such as the level of maintenance), and subjective observations based on auditor perceptions and feelings (such as sense of safety).

The Audit Report concludes with a 'report card'. This is a qualitative summation of the availability and quality of distinct elements of the built environment. The aim is to highlight the ways in which the built environment in each locality may or may not support healthy behaviours in everyday life. As the research continues, this will be augmented with findings from the interviews and focus groups.

Given the comprehensive and extensive nature of the Audit Reports, it is impossible to present them in their entirety here. Nevertheless, we want to give the reader an idea of how we are bringing the information collected together by providing an overview of the reporting process and some insight into the assessment and analysis undertaken during the audits. In the section below, we give a snapshot of assessment of walkability in a residential precinct of Rouse Hill.

Assessment of Walkability in the Southern Precinct of Rouse Hill

Our study site is a master planned neighbourhood located in the suburb of Rouse Hill, in the suburban north west of Sydney. Up to 1800 residential dwellings are planned and a major town centre is also included. The residential precincts surrounding the town centre are still being developed. The Southern Precinct is the most progressed of the residential areas.

The mapping of the audit data was completed in ArcGIS. Figure 1 shows an assessment of the walking environment. Every footpath in the case study site was mapped and given a qualitative assessment of 'good', 'average' or 'poor'. This assessment was based on the following variables: the material, quality and gradient of the footpath; the buffer between the footpath and the street; visibility along the footpath; connectivity; and quality of shading. 'Good' footpaths are indicated in green; 'average' in yellow; and 'poor' are in red. The map also shows land uses (including type, number of building storeys, vacant land and construction), street trees, and temporary obstructions caused by construction.

Figure 1: Quality of footpaths and the walking environment, Southern Precinct, Rouse Hill



The photographs and auditor comments provided below are further data on the assessment of the footpaths and walking environment.

Figure 2: Example of an 'average' footpath, Darrabarra Way, 21 January 2012



As Figure 2 shows, at the time of the audit, there was a significant amount of construction occurring along Darrabarra Way. There were no street trees or shading along the footpaths. There was no buffer between the footpath and the street on the left side, and only a nature strip provided on the right. The type and quality of the footpath material, visibility, and the connectivity of the footpaths to the larger network, were good. The 'average' rating was largely a result of the stage of development, and the construction activities. However, shading along this street needs to be improved.

Figure 3: Example of a 'good' footpath, Hedge Street, 24 January and 25 May 2012



Figure 3 shows the footpaths along Hedge Street. These are of high quality in terms of material, gradient, connectivity, and visibility. Street trees are present, providing a buffer between the footpath and the street, along with nature strips running along both sides of the street.

Figure 4: Shared pathway, Caddies Boulevard, 25 May 2012



Figure 4 shows a shared pathway located alongside a main road, leading towards the Rouse Hill Town Centre. This shared pathway was assessed as 'good' taking into account material, gradient, connectivity and visibility, though the shading was considered to be poor.

Figure 5: Example of a construction-afflicted path – Barabung Way, 25 May 2012



Figure 5 shows Barabung Way, which at the time of the audit was badly affected by construction activities making it impassable. This is an example of the impact of temporal context and the dynamic nature of built environments on data collection. This factor is acknowledged in the Audit Report. The combination of mapping, photography and observations recorded by auditors allows for a clear presentation of the relevant observable phenomena which have altered or shaped the environment at that point in time, but which may not – and in likelihood, will not – have an ongoing impact. Therefore, while the footpath along Barabung Way received an 'average' rating, it was noted that this was due to construction activities, and was subject to change. This is what one of the auditors recorded:

The residential areas connect fairly well to the town centre, but much of the site is still under construction, so it is assumed that this will improve over time. Car and bus are the main modes of transport, with the transport interchange located at the town centre. Opportunity is provided for cycling to the town centre along shared pathways.

Auditor comments such as this add another layer to the assessment of the walking environment, as well as the entire street network. When asked to describe how the streets balance the needs of all users, one auditor wrote:

In the residential precincts, the car is still prioritised over the pedestrian/cyclist – but there are a number of shared pedestrian/cycleways provided on main roads, and significant effort has been made to provide a pleasant walking environment as well as opportunities for recreational walking and cycling.... In the Town Centre, the pedestrian is prioritised over other users. There are ample opportunities for cyclists to ride to and park at the Town Centre (and lots of pedestrian crossings), and though parking is provided, it is limited and speed limits are slow.

Overall, the auditors determined that the footpaths in this precinct of Rouse Hill were of high quality. They were predominantly made of concrete; well maintained; flat; free of obstructions; and continuous. Where obstructions or degraded surfaces existed, they could largely be attributed to construction activities. However, the quality of shading across the site was typically poor. Significant numbers of street trees have been planted, but the majority of these have not achieved the level of growth necessary to provide shade, and there is an absence of other types of shading.

This information will be augmented with the individual interview and focus group data, to determine consistencies and differences between the auditors’ analyses and resident experiences. This will provide deeper insights and understandings about the relationship between the quality and layout of the physical walking environment (as recorded by the auditors) and everyday patterns of activity, consumption and interaction and associated health outcomes (as reported and discussed by residents). In particular, questions about levels of satisfaction with the walking environment; the values residents place on walking for pleasure and transport; routines of everyday recreational and utilitarian physical activity; and perceived and actual barriers to walking in their neighbourhood, will allow us to augment the findings of the audit, thereby presenting a rich, multi-layered assessment of the health supportive nature of the built environment.

Community Food Assessment

Together with the HNA results, the findings from our community food assessment tools will be important in informing further data collection, as well as providing an overview of the status of healthy food availability in the neighbourhoods being investigated. In this final section of the paper we present a synopsis of the findings from the two food assessment tools

Supermarket Survey

Twenty three supermarkets were surveyed near the study sites with the exception of Renwick which is yet to be fully developed (see Table 2 and Crawford et al, 2013a for more details).

Table 2: Supermarket chain stores by study site

Study Site	Supermarket Type	Number
Victoria Park	Large chain A	1
	Large chain B	1
	Discount chain	2
	Independent	2
Rouse Hill	Large chain A	2
	Large chain B	2
	Discount chain	1
	Independent	2
Airds Bradbury	Large chain A	2
	Large chain B	2
	Discount chain	2
	Independent	4
Total	-	23

Food costs, availability and quality were calculated using the tool and are shown in Table 3.

Table 3: Mean cost, variety and quality of food items in supermarkets by study site

Study Site	Number of supermarkets	Mean cost	Mean variety	Mean quality
Victoria Park	6	\$173	50	43
Rouse Hill	7	\$180	57	42
Airds Bradbury	10	\$180	49	38
Total	23	\$177	52	41

The mean cost of the healthy food basket was slightly lower in Victoria Park when compared to Rouse Hill and Airds Bradbury. However, there were considerable differences in a basket cost between supermarkets for each study site. For example, a difference of \$80.24 was found between the cheapest and most expensive basket in the Airds Bradbury area, while a difference of \$75.78 and \$110.42 was observed for supermarkets near Rouse Hill and Victoria Park respectively. The cost of the healthy food basket was also consistently cheaper in discount supermarkets, when compared to the two large supermarket chains and independent grocery stores.

The mean number of fresh fruit and vegetable items also differed by study site, with more varieties present in supermarkets in the Rouse Hill area, when compared to Victoria Park and Airds Bradbury. The two large supermarket chains consistently displayed more varieties of fresh produce than the other stores in all study sites.

The mean quality of fresh fruit and vegetable items was lower in Airds Bradbury when compared to Rouse Hill and Victoria Park areas. Additionally, there were considerable differences in the quality of items between stores, with higher quality items consistently observed in the two large supermarket chain stores. The implications of differences in healthy food costs, variety and quality are all issues which will be further explored with interviewees and focus group participants, including specific questions such as:

- How does the ability of residents with varying economic resources to purchase healthy and non-healthy food affect well-being?
- What are community perceptions of the price and availability of healthy and non-healthy food?
- How do car ownership and public transport services impact on ease-of-access to healthy food in high and low SES areas?
- Do residents have access to nearby community gardens where they can grow and harvest cheap, healthy and culturally appropriate foods (see for example, Donovan et al, 2011)?

Farmers' Market Survey

A produce survey was undertaken at six farmers' markets closest to the four study sites – see Table 4 and also Crawford et al (2013b). We found that the proportion of food stalls differed between farmers' markets, with more fresh fruit and vegetable stalls evident at farmer / producer markets. Additionally, almost all stalls at farmer / producer markets sold local produce directly from the farm. While the cost and presentation of fruit and vegetables differed between stalls and markets, most produce was of high quality. Private markets had more gourmet produce and take-away food options.

A total of 181 customers and 42 stallholders from the six farmers' markets completed our short questionnaire (see Table 4).

Table 4: Customer and stallholder surveys by farmers' market and study site

Study site	Market type	Customer surveys	Stallholder surveys
		n	n
Victoria Park	Large private market	61	7
Rouse Hill	Farmer / producer market	32	9
	Small private market	0	4
Airds Bradbury	Farmer / producer market	51	6
Renwick	Large private market	20	11
	Farmer / producer market	17	5
Total		181	42

Preliminary findings from the customer surveys indicate that almost 60% were female with an average age of 45 years at the market near Victoria Park to 60 years at one of the markets near Renwick.

Travelling distances ranged from an average of 6km for the market near Victoria Park to 51km for the market close to Airds Bradbury. Although three quarters of participants drove to reach the markets, a small number of participants walked or caught public transport, particularly for the market near Victoria Park. This issue will be explored further in the interview component of the study.

Most customers reported shopping for food more than once per week and attended farmers' markets once per month. On average, most customers spent less than \$100 at farmers' markets each visit. Almost three quarters of customers felt that it was very important to buy top quality, fresh produce. Buying local produce, talking to stallholders and enjoying the experience of shopping at farmers' markets was also very important for customers. Customer behaviour at farmers' markets will be examined in greater detail in the next phase of our research.

The survey of stallholders revealed information about categories of fresh and gourmet produce available for purchase as well as the location where produce was grown or sourced (for details see Crawford et al, 2013b). Most stallholders (78%) considered it very important to sell their produce directly to customers, as well as provide information and build relationships with them. There was a strong commitment to selling goods produced in an environmentally friendly and sustainable way (87% of stallholders).

The insights from the assessment of farmers' markets provide interesting avenues to explore in greater depth during interviews with residents of our study sites. The availability of fresh fruit and vegetables from markets that are an enjoyable and social event may encourage healthy eating more often. Understanding why people are attracted to visit and shop at farmers' markets might also help to entice other customers, thereby increasing consumption of healthy food.

Conclusion

This paper has presented selected findings of an ongoing research project exploring the role of the built environment in supporting health and well-being as part of everyday living. The research methodology has been articulated, illustrating how each segment of data collection is interrelated and addresses the research questions. Neighbourhood observations and food environment assessments have been described, with preliminary results presented. The ways in which interviews and focus groups with residents will augment this data have been noted.

Our interviews and focus groups with residents in each case study site are now well underway. A participant recruitment strategy was developed earlier this year, and following ethics approval, is being implemented. A project information flyer has been distributed through key community representatives in each neighbourhood. Residents who agree to an interview are contacted to arrange to hold this either in-person or by telephone. Interviewees are being asked to participate in focus groups, with additional participants being recruited via snowball sampling. The focus groups will permit further exploration of the ways in which the study sites support or hinder healthy behaviour.

The interview and focus group data allow for the completion of the triangulation methodological technique adopted for this study. The comprehensive methodology, combining different quantitative and qualitative data collection related to built environment sites, food availability assessments and resident experiences and knowledge, will provide in-depth insights and sophisticated understandings about how these particular places support human health and wellbeing. Our work, which brings research partners from the health and built environment sectors together, is contributing to a more nuanced appreciation of the complex and contextual nature of supportive environments for healthy living.

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