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# Designing Walkable Future Neighbourhoods: Considering Diversity

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# Abstract

Walkable neighbourhoods are one of the holy grails of current urban planning and design. The perceived benefits of walkable neighbourhoods are wide ranging. However, much of the research that supports this endeavour is based on the notion of an adult able-bodied walker. In reality, pedestrians are as diverse as the population itself – with different physical, social, cultural, emotional and financial abilities and resources to navigate the neighbourhood landscape. It is critically important that this diversity is recognised at the design and planning stages of future 'walkable' neighbourhoods, as a failure to do so may exclude people from walking in their own neighbourhood. It is also important that we recognise that the resident population of a neighbourhood is not static, people will arrive and leave, all residents will age; some will become less able over time (through injury or illness); and some children will be borne to families living in the neighbourhood. This means that the planning and design of all neighbourhoods needs to recognise not only a level of diversity for the 'first' residents but also that this diversity is likely to increase over time.

This Working Paper consist of a review of the literature relevant to three vulnerable and often overlooked groups when designing neighbourhoods: children, older people and people with a disability. For ease of use, each review is presented as a separate Part, with its own Bibliography. In conclusion, the review identifies both commonalities between the needs of the three population groups for creating more liveable and accessible neighbourhoods and contradictions between the needs of different individuals. Recognising these contradictions is an important step in resolving them. Ignoring the diverse needs of people of different abilities and ages is not the way to go.

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# Designing Walkable Future Neighbourhoods: Considering Diversity

## Introduction

Walkable neighbourhoods are one of the holy grails of current urban planning and design. The perceived benefits of walkable neighbourhoods range from enabling physical activity that positively contributes to health whilst addressing the risk of injury to pedestrians by reducing vehicle traffic; through reducing carbon emissions from fossil-fuel-based transport, and reducing noise and environmental pollution from motorised vehicles; to enhancing the potential for stronger social connections, as a result of pedestrian encounters; and reducing social exclusion by enabling access across the neighbourhood, for those without private transport. Much of the research that supports this endeavour is based on the notion of an adult able-bodied walker (Stafford and Baldwin, 2018). But pedestrians are as diverse as the population itself – with different physical, social, cultural, emotional and financial abilities and resources to navigate the neighbourhood landscape. Pedestrians will have a range of possible desired routes and destinations; and diverse reasons for walking (including both passive and active exercise, interaction with nature, visiting a local shop, travelling to a bus stop, and walking home from school).

It is critically important that this diversity is recognised at the design and planning stages of future 'walkable' neighbourhoods, as a failure to do so may exclude people from walking in their own neighbourhood. It is also important that we recognise that the resident population of a neighbourhood is not static, not least because some people will leave and others will move in. The current preference for ageing in place discussed later in this paper, is a reflection of a larger fact, that many people become attached to and established in their neighbourhood, suburb or precinct within a city. People establish social ties and their children's school commitments, and plan journeys-to-work that build on their residential location. In addition, all residents will age; some will become less able over time (through injury or illness); and some children will be borne to families living in the neighbourhood. This means that the planning and design of all neighbourhoods needs to recognise not only a level of diversity for the 'first' residents but also that this diversity is likely to increase over time. A more holistic approach to planning and designing healthy neighbourhoods, bringing together the diversity of current and future needs is required (Forsyth et al., 2017)

This review pays relatively little attention to the inside of buildings, except with regard to accessibility. The review pays little attention to the potential contribution that a diverse housing stock can contribute to community stability and resilience. The main focus of the

review is on the external built environment, and specifically the importance of small and large-scale design for enabling people from different ages and abilities to walk within neighbourhoods. For children, the ability to walk independently to play spaces also requires the consideration of the nature of a 'play space' or 'play opportunity'. The research literature is in agreement on two matters: firstly, for a child the walkable journey itself can provide opportunities for play; and secondly the 'play opportunity' or 'affordance' (a concept first introduced by Gibson, 1979) may be unexpected and diverse. For example a tree is an affordance that provides multiple opportunities, if allowed: namely to climb, to swing from branches, to hide and to seek, to watch birds, to collect leaves and to gather sticks, to tell stories and to act them out etc.

The review consists of three main parts. Each part reviews the research literature with regard to a similar question.

Part 1: Are Suburban Neighbourhoods Meeting the Needs of Children for Independent Mobility and Access to Play?

Part 2: Are Suburban Neighbourhoods Meeting the Needs of Older People?

Part 3: Are Suburban Neighbourhoods meeting the Needs of Disabled People?

Inevitably there is some overlap between these three Parts, particularly acknowledging that there can be people of all ages with disabilities, and that the likelihood of an impairment increases with age. For example, Baldwin and Stafford (2019) found both more-able older people and younger people with a disability identified the same barriers to access: lacking or uneven footpaths, missing kerb cuts and ramps, lacking seating, and slipping / tripping hazards (such as cobblestones). In addition, the need for neighbourhood design to have more regard for children with mobility impairments is highlighted in the following quote:

> "Neighbourhood streets do not just appear – their design is socially constructed. What a street looks like, the function it serves and the people and activities it permits are all based on socio-cultural norms that evolve and change with society. The neighbourhood street is embedded with a multitude of assumptions about actors and activities permitted and omitted in the street. Children with mobility impairments, belong to two such groups that do not fit in with the normative thinking of street actor. … immobility encountered by children reinforce how street design privileges particular bodies ('able' and 'adult') and objects (vehicle over pedestrians), while othering and devaluing children with mobility impairment by making problematic non-normative habitual ways of moving about space." (Stafford, et al., 2019)

Findings from the literature reviews for each of the three parts are as follows.

Part 1: Children

This literature review finds that parental attitudes towards independent mobility and play have a far greater impact on all children's activity levels than the number and diversity of play opportunities, or any other environmental factors. Whilst neighbourhood safety concerns (be it from traffic or from strangers) play an important role, the perceived level of neighbourhood and social cohesion is critical in allowing children more independent mobility. Built environment factors that can address safety concerns and support social cohesion include: the presence of pedestrian footpaths / pavements and pedestrian crossings; traffic calming designs that reduce traffic volume and speed; improvements to driving and parking behaviour that puts pedestrians at risk on the footpath; the provision of appropriate cycling infrastructure; low residential fences and dwellings oriented so that their front doors face each other; easy safe access to a diversity of play spaces, green spaces, communal gathering spaces, local shops and community facilities (such as a library), and bus stops; the involvement of children of all ages in designs; and excellent maintenance of the public realm.

Part 2: Older People

Neighbourhoods are changing to meet the needs of the growing population of older people who want to age in place. Older people encounter many physical and cognitive changes as they age, leading to a reduction of the areas in which they spend the majority of their time in later life. With home and neighbourhood being the two main functional locations, it is important neighbourhoods are designed in order to encourage the continuation of both an active and independent lifestyle, thereby supporting both the well-being and quality of life for older residents. Recognising that neighbourhoods designed specifically for one age bracket can lead to negative outcomes for others has led to a focus on planning neighbourhoods which can be used by people of all ages and abilities.

There is complexity involved in both defining a neighbourhood and designing a neighbourhood. Both processes involve the recognition of the physical, policy, and social environments. The main consideration to be made when designing age-friendly environments for older people (mainly located in suburban areas), is the incorporation and provision of accessibility and ease of use. Designing a walkable neighbourhood with the inclusion of simplistic features, can contribute to producing more accessible and age-friendly environments. The physical, social, and recreational opportunities that greenspaces, open spaces and community spaces offer to older people make them a vital component of future neighbourhoods. Critical design features of age-friendly neighbourhoods include: design for safety; access (or close proximity) to facilities and services; well-maintained pavements, pedestrian crossings and community public spaces; suitable street layouts and traffic calming methods; mobility options (such as appropriate public transport); user friendly green spaces; thoughtful design of porches and front gardens enabling social exchange; and community opportunities for neighbourly relationships to develop and be sustained. In addition, involving

older people in the planning and design processes can contribute to making ageing in place neighbourhoods more accessible and inclusive.

Part 3: People with a disability

A key idea that has emerged out of disability theory, and therefore consideration of urban planning and architecture, is the oppression that is created by a poorly designed environment, be it from physical access barriers, wayfinding / navigation barriers, information barriers, and/or safety barriers. Thought into designing for different bodies and needs has not occurred seriously until recent decades, and because of the longevity of the built environment, disabling environments still remain a problem to be addressed.

Disability in suburbia is a complex topic, due to covering a wide array of different impairments and environments, including open space, streets, houses and public buildings. This has been a wide overview of the relevant literature and the themes which emerge from it. Improved design can be at the small-scale (recognising that one inaccessible component nullifies and accessible journey) and at the larger scale, such as across a neighbourhood. Design initiatives, such as universal design and inclusive design, offer the possibility of improved outcomes, whilst recognising the need to negotiate different and conflicting needs. The solution to this largely appears to be better community consultation (and disabled people are experts in their own needs), and the potential to design in the possibilities for adaption in the future.

Good design for people with disabilities may be a difficult and slow process, especially in old neighbourhoods where solutions must be retrofitted. The factor that makes the largest impact, however, is the will of the designers to work with the community to create a product suitable for all. As has been found, disabled people are not passive victims of their environments but enjoy being changing forces within their communities. Listening to them will overall be beneficial for everyone.

## Conclusion

Whilst the reviews of the literature are presented as separate parts, it is clear that future neighbourhoods will be home to a diversity of people over time. It is important for urban planners and designers, and all those involved in the creation of neighbourhoods, to note that the real world does not fit so neatly into one of these 3 boxes. Whilst there are many commonalities between the three parts, as to what lessons we can draw for future neighbourhoods, there are also significant differences, particularly at the micro-scale. We recognise that just as we have acknowledged that there may be contradictions between, for example, the best designs for people who are wheelchair users and those with limited stamina, there may also be contradictions between designing for the needs of older people (for quiet spaces) and children (for noisy play). Similarly, the built environment needs of

someone experiencing dementia may differ significantly from those of a child with a visual impairment. We consider that recognising these contradictions is an important first step in resolving some of them. Ignoring the diverse needs of people of different abilities and ages is not the way to go.

## References


Baldwin, C. and Stafford, L. (2019). The Role of Social Infrastructure in Achieving Inclusive Liveable Communities: Voices from regional Australia. *Planning Practice and Research*, 34 (1) 18-46.

Forsyth, A., Salomon, E. and Smead, L. (2017). *Creating Healthy Neighborhoods: evidence-based planning and design strategies*, Chicago, IL: American Planning Association

Gibson, J. A. (1979). *The Ecological Approach to Visual Perception*, Boston, MA: Houghton Mifflin.

Stafford, L., Adkins, B. and Franz, J. (2019) Bounded at the Driveway's Edge: body-space tensions encountered by children with mobility impairments in moving about the neighbourhood street, *Children's Geographies*
Published on line July 2019: https://doi.org/10.1080/14733285.2019.1635992

Stafford, L. and Baldwin C. (20!8) Planning Walkable Neighbourhoods: Are We Overlooking Diversity in Abilities and Ages? *Journal of Planning Literature*,33(1): 17 - 30

# Part 1: Are Suburban Neighbourhoods Meeting the Needs of Children for Independent Mobility and Access to Play?

## Introduction

This literature review explores topics relevant to children's independent mobility and access to play in suburban neighbourhoods. Four parameters have directed the work:

- Children's age: five to 15 years old;
- Research methodology: where possible, studies that involve children as primary research subjects;
- Country of origin: a preference for countries with reasonably comparable living conditions to New Zealand; and
- Study focus: experiences of children in suburban neighbourhoods (instead of inner-city or rural areas).

Most literature focused on primary school children and adolescents. Findings that appear to be relevant to teenagers have been presented in a separate section.

## Theme 1: Independent Mobility: or the right to roam

The concept of independent mobility underpins most literature regarding children's access to play opportunities. Independent mobility is an integral part of children's development: it supports children's physical, social, cognitive, and emotional development; it helps to establish and support bonds with other children; it contributes towards children's daily physical activity; and it helps children to develop resilience (Rogers, 2012; Carver, Watson, Shaw, & Hillman, 2013; Bhosale, Duncan, Schofield, Page, & Cooper, 2015). Independent mobility restrictions have negative consequences: greater feelings of loneliness; a weaker sense of community; a lower sense of safety; and less frequent social activities with friends (Pacilli, Giovannelli, Prezza, & Augimeri, 2013). Loebach and Gilliland (2016) regard the opportunity for children to "playfully and independently" explore their neighbourhoods as "fundamental to their development and well-being" (p. 575). Independent mobility enhances children's feelings of power and control, which has a positive impact on general health and wellbeing (Pacilli et al., 2013). Children establish their own personal spatial history, develop practical mapping skills, and increase their general spatial knowledge through independent travel - skill attainment that can't be achieved easily by those who cannot travel unaccompanied (Valentine, 2004; Tranter, 2006; Carroll, Witten, Kearns, & Donovan, 2015). Gaining familiarity with the local neighbourhood and its inhabitants boosts children's confidence in themselves and their own ability to cope with challenging situations (Witten & Carroll, 2016). Travelling independently also provides children with age-appropriate training

for their teenage years, equipping them with skills they will need to leave their suburb for secondary school (Freeman & Quigg, 2009).

Children gain intrinsic benefits from having the opportunity to enjoy 'just walking' behaviour: socialising with friends is highly valued, turning a walking journey into a play experience (Brown, Mackett, Gong, Kitazawa, & Paskins, 2008; Badland et al., 2016). Walking without supervision also enables children to enjoy unscheduled breaks at play destinations they pass on the way (Smith et al., 2012; Depeau et al., 2017). Freeman & Quigg (2009) and Pacilli et al., (2013) claim that children gain value from the opportunity to negotiate their own independent social transactions, which is an important developmental step in the continued quest for autonomy. Hillman (2006) agrees that children find it exciting and enjoyable to spontaneously initiate their own social encounters. Mitchell, Kearns, and Collins (2007) find that children enjoy their daily walk to school, particularly if they undertake it with friends, and that children who are driven from school would often prefer to walk.

Loebach and Gilliland (2014) describe children's freedom to move independently in their neighbourhoods as their 'territorial range', which they categorise as:

1. Habitual range: easily accessed settings near the child's home;
2. Frequented range: neighbourhood locations that are periodically accessed, and generally bounded by a combination of parental restrictions and physical elements (such as a busy road); and
3. Occasional range: infrequently-accessed locations on the edge of the child's territory, often accessible only by public transport.

Moran, Plaut, and Merom (2017) note in an Israeli study that suburban children had lower territorial range than inner-city children, which they attribute to the hard boundary created by highways at the edge of suburbs. This supports Loebach and Gilliland's (2014) theory that boundaries shape children's 'frequented range'. Research (Babb, Olaru, Curtis, & Robertson, 2017; Chambers et al., 2017) identifies a typical territorial range of around 500m for most children. However, Veitch, Salmon, and Ball, (2008) note that some children report ranges as low as 100m. Chambers et al. (2017) calculate that children spend more than 50% of their independently mobile time within the 500m buffer. This 500m range typically represents suburban neighbourhood limits, and is seldom exceeded (Freeman & Quigg, 2009). Loebach and Gilliland (2014) conclude that nearly 95% of children played within 400m of their home. Collectively, these findings support the need for density and proximity of affordances within neighbourhood.

Carver et al. (2013) discuss children's freedom to travel independently in terms of 'mobility licences', with different licences given for different types of trips: a licence to travel home from school unaccompanied, for example, or a licence to travel on local buses alone. Carver,

Veitch, Sahlqvist, Crawford, and Hume (2014) acknowledge that children who initially have permission only for unaccompanied school journeys may later achieve the licence to make recreational trips. Children who are granted freedom to play in public also play more in other contexts (Prezza, 2007). Independent mobility has been linked to higher physical activity rates and noted that active school travel is a good general indicator of children's physical activity levels (Badland et al, 2015; Babb et al., 2017), so it seems reasonable to assume that independent or escorted active school travel may serve as a precursor to more general independent mobility. Badland et al. (2015) argue that better understanding broader child-related travel patterns will help transport planners to support children's travel needs.

Veitch et al. (2008) and Pacilli et al (2013) suggest that children's territorial range expands as they become older. Castonguay and Jutras (2009) attribute this both to parents' increased confidence in their children's abilities, and to changes in children's play preferences, in line with their developing maturity. Younger children value familiarity and prefer to stay near home, whereas older children value increased autonomy, and express that by extending their territorial range (Castonguay & Jutras, 2009). Younger children must therefore settle for play facilities within their permitted territorial range, but older children have more opportunity to choose play destinations based on personal preferences (Jansson & Persson, 2010).

Studies indicate that birth order may influence the age at which children become independently mobile, with positive correlations between having an older sibling, and unsupervised outside play at a younger age (Valentine, 2004; Pacilli et al., 2013). This suggests that parents may relax their concerns after their first child plays outside independently without negative consequences. Only children tend to gain independent mobility at a later age (Pacilli et al., 2013). Parents may simply be more cautious with their first child. Another study by Bringolf-Isler et al. (2010) finds that having younger siblings increases older siblings' freedom.

## Theme 2: Children and neighbourhoods

The importance of neighbourhoods

A number of studies (Oliver et al., 2015; Wang et al., 2017) recognise neighbourhoods as child-relevant 'places': children's domains, where they can control territory. Children demonstrate a strong sense of physical and social connection to their neighbourhoods, which provide the landscape for most of their daily experiences (Freeman & Quigg, 2009; Freeman & Tranter, 2011; Rogers, 2012). Children want to feel a sense of belonging in their neighbourhoods, and to be able to move about safely, access places to play, and socialise with friends (Witten & Carroll, 2016). Children also value the quiet and peacefulness of their suburban neighbourhoods (Carroll et al., 2015). Neighbourhoods typically represent safety and familiarity (Witten & Carroll, 2016; Kearns, Carroll, Asiasiga, & Witten, 2016).

Freeman and Tranter (2011) describe the essential role neighbourhoods play in children's lives: "Neighbourhoods are places where they begin to encounter the world outside their home, where they make their first independent forays and where they become part of wider public life." (p. 77). Children understand the value of 'ambient companionship' from a young age, and prefer to spend most of their time around other people (Nansen et al., 2015; Moran et al., 2017).

Integral to children's perceptions of their neighbourhoods are the social networks and childhood play opportunities that they provide. Rogers (2012) comments: "The combination of *space* and *friends* formed a nexus within which spontaneous, autonomous, absorbing play occurred" (p. 497). The act of exploring with their friends builds strong peer associations with places (Lidén, 2003). Children appreciate proximity to friends and to places to play, as well as easy access to amenities like local shops (Carroll et al., 2015). Children are motivated to play in public open spaces if they might encounter play companions there (Wheway & Millward, 1997; Veitch, Salmon, & Ball, 2007). Carroll et al. (2015) note that the sociability of playing at parks was of great importance to many children, writing: "Many accounts of parks had a strong relational aspect: the park was about play; but it was also about playing with friends." (p. 427). Pacilli et al. (2013) credit children's independent mobility with the power to build stronger communities, writing: "[By contrast], children's autonomy fosters their integration in local social networks, promotes parents' social ties with other parents as well as their sense of belonging to the local community." (p. 389).

Designing child-friendly neighbourhoods

O'Brien (2003) and Valentine (2004) discuss urban planners' and urban designers' historical and ongoing failure to properly consider children's public space needs and use patterns. Walsh (2006) interprets the dominance of 'closed' play options, with fixed equipment and limited opportunities for creative play, as evidence that play spaces are being designed according to adults' perceptions of what children enjoy. The importance of providing diverse and proximate opportunities for play is highlighted by Wheway and Millward (1997), and Hendricks (2001). Cole-Hamilton and Gill (2002) conclude that children will find opportunities to play everywhere. Whilst other researchers (Valentine, 2004; Broberg et al., 2013) recognise that whole environments must be designed with children's needs in mind, not just playgrounds or playgrounds or school routes. This contrasts with historical expectations that children must adapt their behaviour to fit into an adult environment (Mitchell et al., 2017).

Various attributes contribute to a child-friendly suburb. Freeman and Tranter (2011) claim that what is needed is a good social environment, and a good physical environment. Sharmin and Kamruzzaman (2017) present their own key criteria: "children's possibilities for independent mobility; and their opportunities to actualize environmental affordances" (p. 104). Broberg,

Kyttä, and Fagerholm (2013) describe child-friendly neighbourhoods more extensively, and highlight the following six elements that these places should provide:

1. Opportunities for children to care for places they loved and respected;
2. Affordance actualisation in places, to enable meaningful exchanges between child and place;
3. Opportunities for environmental learning and environmental competence;
4. The ability to create and control 'territories', and protect them from harm;
5. Privacy experiences and the opportunity to nurture childhood secrets; and
6. Opportunities for children to express themselves in space (p. 111).

Loebach and Gilliland (2016) explain that, contrary to their expectations of insufficient opportunities for play, suburban neighbourhoods offer plenty to entertain children who are sufficiently empowered to access play opportunities. They recommend that neighbourhood affordances should be audited and evaluated to determine overall child-friendliness (Loebach & Gilliland, 2016). Children often roam from place to place while playing, using the entire environment as a play space (Wheway & Millward, 1997). Freeman and Tranter (2011) claim that a wealth of dedicated play spaces in a city may be evidence of 'child unfriendliness', because it suggests that children should only play in those spaces. O'Brien (2003) disagrees, instead calling for dedicated children's spaces: "Children's emphasis on their improving play and leisure space, found in our study, suggests that contemporary children are expressing a desire to be in the neighbourhood, to have a public space for themselves." (p. 146).

Castonguay and Jutras (2009) note the importance of giving children sufficient opportunity to express their wishes for their environment, and argue that this is an essential step in building a 'child-friendly city'. O'Brien (2003) discusses a study that shows how participating in consultations tend to have highly practical and constructive requests, raising issues about the need for increased street cleaning and better street lights, for example. Rogers (2012) identifies several environmental suggestions from children who have taken part in consultations, including: the reduction or elimination of crime and antisocial behaviour; better maintenance and improvement of the built environment; and improved services and amenities, particularly those directly relevant to children's needs and interests, like playgrounds, sports fields, libraries, and cinemas (Rogers, 2012). Research (Mitchell et al., 2007; Witten & Carroll, 2016; Veitch et al., 2017) shows that children notice if their play spaces are badly maintained, which highlights the need to prevent vandalism and remove antisocial elements, such as graffiti and broken glass. O'Brien (2003) acknowledges that adults may not have realised the degree to which these antisocial elements discourage children's play.

Sharmin and Kamruzzaman (2017) call for changes in land use distribution to better meet children's needs, with child-relevant destinations designed in close proximity. Child-friendly urban design is interpreted (Villanueva, 2014; Jansson, Sundevall, & Wales, 2016) to include

walkable neighbourhoods, and physical separation of motor vehicles from pedestrians and cyclists. Carroll et al., (2015) agree that child-friendly urban design must move beyond playgrounds, and should instead include transition spaces and semi-private threshold spaces. Whitzman and Freeman (2015) argue that all locations are important and relevant to children, and should therefore be designed with their needs in mind. Freeman and Tranter (2011) mention the risk of sanitising neighbourhoods in a quest for child-friendliness, warning that totally safe neighbourhoods represented a form of limitation, offering nothing for children to explore or learn about. They advocate for challenging neighbourhoods that provide opportunities to develop resilience (Freeman & Tranter, 2011).

Neighbourhood types

Mixed use neighbourhoods offer adults a broad range of activities, but children living in these neighbourhoods tend to stay closer to home (Loebach & Gilliland, 2016). Interpreted positively, this would suggest that their social and play needs were met near home. A negative interpretation would indicate that other opportunities for play were too distant to reach (Loebach & Gilliland, 2016). However, areas offering a mix of local destinations attract people, increasing natural surveillance and 'eyes on the street' (Foster et al., 2015). Children in purely residential areas also often report low independent mobility levels (Foster et al., 2015). This is attributed to a lack of local affordances, but it is acknowledged that parents' attitudes towards independent mobility mostly significantly influence their children's behaviour (Foster et al., 2015).

## Theme 3: Children and play

The importance of play

The benefits of play, which include: opportunities to socialise with friends; enhanced social skills through play encounters; improved mental and physical health; educational gains achieved through play activities; and the enjoyment derived from being active, are discussed in a number of studies (Korpela, Kyttä, & Hartig, 2002; Brockman, Jago, & Fox, 2011; Freeman & Tranter, 2011). Play is intrinsically valuable to children, because it is enjoyable (Freeman & Tranter, 2011).

Several studies (Cole-Hamilton & Gill, 2002; Brockman et al., 2011) suggest that children greatly value the freedom of unsupervised play, and its temporary respite from adult control. A negative correlation has been identified between adult supervision and children's activity levels at parks: many children prefer to play at parks without adults present (Veitch et al., 2007; Broberg et al., 2013; Jansson et al., 2016). However, this anti-adult attitude is not universal. Plenty of children enjoy visiting parks with family members, and fathers are particularly valued as park companions (Veitch et al., 2007). Children have longer and more frequent outdoor play sessions during the weekends, which suggests more discretionary time

for play during those days, and reinforces the benefits of adults being available for supervision (Faulkner, Mitra, Buliung, Fusco, & Stone, 2015).

Societal benefits of children's independent play

Everybody appears to benefit when children are free to play in public. Mitchell et al. (2007) claim that the presence of children in public breaks down barriers between adults, contributing to a lively, communal environment. Children in public spaces indicate community cohesion, and are a sign of freedom and belonging (Mitchell et al., 2007; Freeman & Tranter, 2011). Independent mobility is considered crucial in the rehabilitation of communities: "children's autonomy fosters their integration in local social networks, promotes parents' social ties with other parents as well as their sense of belonging to the local community" (Pacilli et al., 2013, p. 389).

Play preferences and preferred locations

Many children greatly prefer outdoor play (Hendricks, 2001; Babb et al., 2017). However, Wheway and Millward (1997) highlight that, although children may prefer outdoor play in parks, this isn't always the most utilised play opportunity. Instead, observations of children's actual play practices show that they spend most of their time playing on the street (Wheway & Millward, 1997). This could suggest that children cannot pursue the play opportunities that most appeal to them. It appears that park visits mainly occur with adult supervision (Prezza, 2007; Senda, 2015).

A range of play opportunities pursued in public open spaces has been identified, including playground use, imaginative play, adventurous play, impromptu or casual sports activities, and games with rules (Wheway & Millward, 1997; Castonguay & Jutras, 2009; Jansson et al., 2016; Witten & Carroll, 2016; Babb et al., 2017; Chaudhury, Hinckson, Badland, & Oliver, 2017). Children value variety in play affordances (Castonguay & Jutras, 2009). Some evidence (Scarlett, Naudeau, Salonius-Pasternak, & Ponte, 2005; Gleeson, Sipe, & Rolley, 2006; Walsh, 2006) indicates a preference for adaptable materials and open-ended play spaces, leading to the popularity of adventure playgrounds and 'junk' playgrounds. However, traditional play equipment is still popular with many children (Wheway & Millward, 1997). Castonguay and Jutras (2009) claim that children's traditional preference for natural places has been replaced with a preference for playgrounds, community spaces, and other adult-designed play spaces. They acknowledge that this might be less because children no longer enjoy nature-based play, and more because children's access to natural place spaces had declined (Castonguay & Justras, 2009).

Some children associate 'play' with less active, more sociable behaviour, such as chatting with friends (Thomson & Philo, 2004; Rogers, 2012). Babb et al. (2017) refer to children who are empowered to independently access play opportunities, but seldom choose to do so. These

children may be more anxious about independent play, or simply have less general interest in expressing their spatial independence (Loebach & Gilliland, 2014). Authors (Veitch et al., 2007; Faulkner et al., 2015) recognise that some children just prefer inside games to outside play.

Veitch et al. (2008) conclude that children prefer to play in their own gardens, which is reportedly consistent with the findings from other studies. O'Brien (2003) and Kearns et al. (2016) agree. O'Connor, O'Rourke, Robinson McGunnigle, and McCormack (2017) use findings from *The Irish Neighbourhood Play Project* to identify the garden, the house, and the road as children's top three play locations. Carroll et al. (2015) agree that friends' and family members' houses - categorised as 'fourth spaces' - served as an important play destination for many children, and particularly for Māori and Pacific children. Valentine (2004) perceive this preference for private play space as negative, demonstrating the limited degree to which children can independently explore public space. However, Page, Cooper, Griew, and Jago (2010) discuss findings from an extensive British study that reveals children's favourite play spaces as friends' houses, their school, local shops, and parks and playgrounds. This reinforces the value that children place on variety in their play affordances. Karsten (2005) studied historical Dutch play habits and concludes that children were traditionally given no choice but to play outside, as inside space was seen as 'adults' space'. The modern combination of smaller families and larger houses has provided more space for children to play inside (Karsten, 2005). School grounds have been identified as valued play spaces (Freeman & Quigg, 2009; Carroll et al., 2015). Witten and Carroll (2016) theorise that children and parents alike regard this location as a safe place for play.

The research literature identifies 'third spaces' - local places that aren't home or school - as places where children can navigate unfamiliar circumstances and environments (Mitchell et al., 2007; Carroll et al., 2015; Witten & Carroll; 2016; Babb et al., 2017). Aarts, de Vries, van Oers, and Schuit (2012) claim that third spaces are as valuable to children as playgrounds and school grounds. In a study of Auckland-based children (Badland et al., 2015), the most popular third space destinations for accompanied and unaccompanied children were retail businesses, sports facilities, parks and other recreational facilities and churches. Carroll et al. (2015) also identify local shops as a favoured play location.

Children value the act of travelling to or between third space destinations as much as the destinations themselves, because travel provides opportunities to play with friends (Wheway & Millward, 1997; Cole-Hamilton & Gill, 2002; Brown et al., 2008). Suburban streets can themselves be play destinations if they facilitate bike and scooter use, and if they aren't heavily used by cars (Kearns et al., 2016). Semi-private 'threshold' places, such as driveways, have also been identified as particularly important sites for independent play, because parents and caregivers perceive them as safe locations (Carroll et al., 2015; Kearns et al., 2016; Witten

& Carroll, 2016). This is particularly unfortunate in New Zealand, which has one of the highest rates of paediatric driveway runovers in the world (Shepherd, Austin & Chambers, 2010).

Children find value in waste ground or undeveloped land, with some authors claiming that children preferred this type of site to playgrounds and other formally designated play spaces (de Monchaux, 1999; Valentine, 2004; Rogers, 2012; Jansson et al, 2016; Kearns et al., 2016). Thomson and Philo (2004) argue that children find excitement and adventure in these sites, even though the possibilities they offer may not be obvious to adults. Moore (1990) discusses children's appreciation of thickly vegetated parks and unused spaces that offer opportunities for concealment - to play hiding games; to construct huts; or to develop tunnels. Unmanicured green spaces reportedly offer a greater range of play opportunities (Jansson et al., 2016).

A distinction can be recognised between *children's places* - informal places where children meet each other and manipulate whatever physical elements they find as part of their play activities – and more formal *places for children*, which are designed by adults (Jansson et al., 2016; Rasmussen, 2004). Moore (1990) notes that the 'degraded' nature of these informal spaces is largely what draws children to them, as they provide opportunities for adventure play that more manicured spaces can't offer. Jansson, Sundevall and Wales (2016) agree, writing: "Unmanaged spaces were described as providing a specific freedom for their [children's] play." (p. 235). De Monchaux (1999) partially attributes the popularity of undeveloped spaces to the way in which these spaces provide children with opportunities to control and alter their environment.

Thomson and Philo (2004) write: "Children and young people probably want spaces suitable less for doing and more for being - for socialising, chatting, hanging out - and as such they may always reject formal, adult designed sites of play in favour of carving out their own informal and disorganised spaces from the adult world around them." (p. 126). Brockman et al. (2011) also claim that children value opportunities to escape from adult rules and control. Rogers (2012) agrees, acknowledging that the attraction of these spaces is the high probability that adults won't be present, which increases children's freedom of interaction.

De Monchaux (1999) suggests that 'children's places' should be converted into 'places for children', to make them aesthetically acceptable to adult members of the community. This suggests both a lack of appreciation for why children appreciate informal places, and a continued assumption that adults' needs outweigh children's preferences. There seems to be a broad societal expectation that children should restrict their play activities to designated play areas (Moore, 1990; Thomson & Philo, 2004). Attempts to turn 'children's places' into 'places for children' demonstrates a continued attempt to contain children's play in adult-designated spaces.

Children have a strong preference for parks and other green spaces (Hendricks, 2001; de Monchaux, 1999; Brockman et al., 2011; Babb et al., 2017). Veitch et al. (2017) credits this both to the affordances that parks offer, and to the aesthetic value children place on green spaces. Research (Boone-Heinonen, Casanova, Richardson, & Gordon-Larsen, 2010; Tappe, Glanz, Sallis, Zhou, & Saelens, 2013; Jansson et al., 2016; Mitchell, Clark, & Gilliland, 2016) shows that proximity to parks increases the likelihood of greater physical activity levels for both genders, and particularly for teenage boys. Pacilli et al. (2013) call for green spaces and parks throughout neighbourhoods, complemented by private outdoor spaces. The quality of the parks is also perceived as an influence on children's activity levels, with good quality parks reportedly correlating to lower levels of screen time and more outside activity (Christian et al., 2016). Rigolon's (2017) Colorado-based study concludes that access to fewer, larger, better-maintained parks with good play facilities is more likely to encourage physical activity amongst children than having a access to a larger number of smaller, less well-equipped parks.

Play facilities and playground design

Walsh (2006) emphasises the importance of designing high quality public play spaces, describing them as "social assets of the community" (p. 137). However, Walsh (2006) also acknowledges that children's requirements should be considered beyond playgrounds, to better enable spontaneous play throughout the neighbourhood. Valentine (204) suggests that parents in all neighbourhoods reports a lack of suitable play facilities for their children. Whilst Wheway and Millward (1997) claim that playground design suffers from a lack of attention, with play spaces being added into new developments on whatever land is left over after residential land allocations have been made.

Chancellor (2007) suggests that, despite significant council investment, many Australian playgrounds are seldom used by children playing independently, and that parents and their younger children are the main users of these spaces. Some studies (Veitch et al., 2008; Noonan, Boddy, Fairclough, & Knowles, 2016) show that well-equipped playgrounds are very popular with children, particularly if they are near their homes and can be easily accessed. However other researchers (Moore, 1990; de Monchaux, 1999; Holt et al., 2015) argue that children are unconcerned about playground quality: any playground is valued, because of all playgrounds provide places to make a noise, encounter other children, and play, with the equipment merely providing a jumping-off point for play activities. Jansson et al. (2016) agree that children greatly value the social aspect of playground use.

Several authors (Wheway & Millward, 1997; de Monchaux, 1999; Chancellor, 2004; Scarlett et al., 2005; Brockman et al., 2011; Jansson et al., 2016; Mitchell et al., 2016) discuss the need - recognised by children themselves - for play spaces to cater for different age groups and developmental stages. Australian studies (Veitch et al., 2007; Veitch et al., 2017) acknowledge that playgrounds are often designed for younger children, and fail to offer sufficient challenges

for older children. As well as recommending playgrounds that provided facilities for different age groups, Walsh (2006) counsels urban designers to include seating for older people in the community, space for teenagers (such as group seating for socialising, and a ball court), and general amenities, such as toilets and water fountains. Gleeson et al. (2006) also advocate for facilities that cater to adult users of playgrounds. However, Carroll et al. (2015) suggest that this does not reflect children's preferences: "Children's sense of ownership of parks and playgrounds was also displayed through their annoyance when play equipment was vandalized, they felt excluded, or their access was limited by the presence of older people." (p. 430).

## Theme 4: Barriers that limit independent mobility and neighbourhood play

Parents' general attitudes towards independent mobility

Children cannot enjoy independent mobility, and thus access play opportunities, without their parents' or caregivers' approval: parental concern appears to be the most pervasive barrier to children's independent mobility. Faulkner et al. (2015) claim that negative parental perceptions of the neighbourhood causes a discrepancy between access to play facilities and actual use of play facilities. Parents acknowledge the deterioration of childhood freedom since their own youth, and recognise that this has eroded their children's social and play opportunities (Valentine, 2004). However, Oliver et al. (2015) report a positive correlation between the proportion of active trips made by children, and their parents' perception of neighbourhood safety. This suggests that parents who can overcome their concerns and enable their children's independent mobility may later recognise that some of their concerns were disproportionate.

Traffic

Widespread parental concerns regarding the risks posed to children by traffic has been identified (Bhosale et al., 2015; Bringolf-Isler et al., 2010; Prezza, 2007; Malone, 2007; Pacilli et al., 2013; Faulkner et al., 2015; Holt et al., 2015; Valentine, 2004; Moore, 1990; Noonan et al., 2016). Traffic accident statistics in most developed world countries would tend to justify their concerns, making this a rational parental fear. An Auckland study on parental mobility licences identified high levels of concern about traffic safety, with the most significant concerns (and hence parental limits on independent mobility) being about inadequate cycling infrastructure for their children (Smith, et al, 2019). Carver et al. (2013) note that, after restricting their children's independent mobility because of traffic concerns, parents often contribute to the traffic problems by chauffeuring their children between walkable destinations. Bringolf-Isler et al. (2010) discuss a possible mismatch between parents' perceived traffic concerns, and the actual risk presented by traffic. However, busy roads are a clear barrier to play, if they must be crossed in order to reach play facilities (Veitch et al., 2008).

Strangers

Several studies (Bhosale et al., 2015; Brockman et al., 2011; Prezza, 2007; Malone, 2007; Faulkner et al., 2015; Holt et al., 2015; Valentine, 2004; Moore, 1990; Noonan et al., 2016) identify concerns about stranger abuse or abduction as a key factor limiting children's independent mobility. In most of the cited studies 'stranger danger' was seen as equal to traffic concerns, but parental fears regarding strangers dominated in other studies (Wheway & Millward, 1997; Lin et al, 2017). In *Public Space and the Culture of Childhood*, Valentine (2004) acknowledges that demonstrated stranger abduction fears do not reflect the statistically low risk of stranger attack or abduction. Another fear was the risk of children being exposed to unwanted influences (Gilliam, 2003).

Unsociable neighbourhoods

Villanueva (2014) highlights parents' general perceptions of their neighbourhood environment as a key factor influencing their children's independent mobility. In general, parents believe neighbourhoods have become less sociable and socially cohesive (Bhosale et al., 2015; Noonan, Boddy, Fairclough, & Knowles, 2017). Parents also believe that passive surveillance levels have deteriorated over time (Karsten, 2005; Holt et al., 2015). Pacilli et al. (2013) describe the vicious circle achieved when parents fear a lack of social cohesion because of their diminished social ties. They write of an inflated perception of public social danger, which reduces parents' willingness to grant their children independent mobility and further reduces social cohesion (Pacilli et al., 2013).

Research has found that children were not attracted to empty parks, because of concerns about possible encounters with threatening or unknown people (Castonguay & Jutras, 2009; Villanueva, 2014; Carroll et al., 2015; Witten & Carroll, 2016; Chaudhury et al., 2017; Moran et al., 2017). Wheway and Millward (1997) note that some potentially attractive play spaces were ignored by children because they were too private. The choice to play in public sight appears both to acknowledge parents' requests to stay where they could be seen, and to demonstrate children's own preference to be around other people (Wheway & Millward, 1997). However, despite some concerns regarding public space and the people and situations they may encounter, children are not unduly fearful about playing or travelling without supervision (Moore, 1990). Witten and Carroll (2016) note that children are usually willing to overcome their caution about navigating their neighbourhood alone:

> "Feeling wary moving about the neighborhood unsupervised did not mean it wasn't a valued experience. Fears were often situation specific and offset by a range of benefits such as learning about the neighborhood, being active and fit, hanging out with friends, fresh air, feeling free and happy, not being embarrassed by your parents, and being independent." (p. 342).

Children's perceptions of adults' behaviour

Mitchell et al. (2007) discuss findings from an Auckland survey of three different suburbs that revealed children's ongoing frustration at adults' unreasonable use of public space. Children in the survey spoke of adults blocking pavements with inconsiderate parking and skips being used in home renovations, motorists reversing from driveways without checking for pedestrians, and adults' expectations that child cyclists will share road space with buses and other large vehicles (Mitchell et al., 2007).

Negative attitudes regarding neighbourhood play

Noonan et al. (2017) discuss the perception that children's unsupervised outdoor play is regarded as a quasi-antisocial activity: affording children outdoor license prior to this socially-construed age may be viewed in certain communities as 'bad parenting'." (p. 1919). Moran et al. (2017) fear that this lack of acceptance of outdoor play may become a social norm, further prompting a widespread shift from outdoor play to indoor play. However, it is noted that, if children are seen playing outdoors, more children are encouraged to join them (Sage et al., 2010).

Disapproval of outdoor play is generally attributed to intolerance regarding the noise of play (Witten & Carroll, 2016). Valentine (2004) criticises adults' expectations that people of all ages should conduct themselves in public to the behavioural standards that adults have imposed. She claims that public space is, essentially, grownup space, and that children and teenagers are expected to modify their use of it accordingly (Valentine, 2004). Children's discomfort with signs that forbid them to play, or forbid them to engage in specific types of play, has been identified (Morrow, 2003; O'Brien, 2003). Christensen, Mygind, and Bentsen (2015) describe potential play spaces that were being controlled by adults' rules as 'contested places'. They celebrate children's decisions to ignore 'no play' signs, seeing this subversive behaviour as evidence of continued negotiation between different users of public space, and summarise this spatial conflict as an example of tensions that exist between adults' perceived 'correct' use of places, and children's desired use (Christensen et al., 2015).

Organised activities

Several researchers identified the increased popularity of organised activities, which is widely regarded as a barrier to independent play because it is perceived to use time that would otherwise be spent playing (Valentine, 2004; Chancellor, 2007; Veitch et al. 2007; Freeman & Tranter, 2011; Bhosale et al., 2015; Loebach & Gilliland, 2016; Noonan et al., 2016). Holt et al. (2015) interpret data regarding increased participation in organised activities as suggesting "… that rather than parents creating a sense of community around neighborhood play areas, they were now more likely to put their children into organized and adult-supervised sports programs." (p. 82). Kearns et al. (2016) attribute parental preferences for organised activities

to a need to manage risk; and a widespread acceptance that adult-led structured leisure activities are developmentally beneficial for children. Freeman and Quigg (2009) defend parents' motivations, arguing that this shift was less about parental aspirations, and more about enabling children to engage in activities they enjoyed.

Valentine (2004) writes extensively about the deficiencies she perceives in the trend for children to engage in organised activities instead of free play and discusses the limited opportunity for children to influence the play opportunities provided in adult-run activities. She also highlights the relative democracy of independent outdoor play, in which different types of children play together: providing opportunities for integration between children from different cultures and backgrounds (Valentine, 2004).

Aarts et al. (2012) argue that the shift towards organised activities is not universal, and is more apparent amongst parents with higher incomes, with their children less likely to engage in outdoor play. Thomson and Philo (2004) express concerns that children who take part in organised activities may be less accustomed to designing their own play, or using their imaginations in play. These children are also seen as being more likely to lack social contact with other children in their neighbourhood (Karsten, 2005). In addition, increased homework levels are recognised as potentially eroding the amount of time available for outdoor play (O'Connor et al., 2017). This factor appears to be prevalent primarily in middle-income families, and is less evident in lower socioeconomic areas (O'Connor et al., 2017).

Peer conflicts

Many children are reluctant to access local play affordances because of concerns about bullying and other antisocial behaviour, in particular from older children and teenagers (Prezza, 2007; Veitch et al., 2007; Castonguay & Jutras, 2009; Brockman et al., 2011; Christensen et al., 2015; Witten & Carroll, 2016; Babb et al., 2017). One study (Brockman et al., 2011) suggests that this concern about older children is more relevant for girls than for boys. Veitch et al. (2007) suggest that the problem of threatening behaviour from older children is more of an issue in low to medium socioeconomic areas. This could signal a lack of leisure facilities for teenagers in those neighbourhoods.

Technology

Noonan et al. (2016) claim that children whose screen time is unrestricted are less likely to play outside. A Japanese study (Senda, 2015) links declining park use to an increase in children's screen time, although it did not reveal how that conclusion was reached. Veitch et al. (2007) suggest that sedentary entertainment can be addictive to children. Christian et al. (2016) view this issue from a different perspective, claiming that increased screen time is caused by insufficient local destinations to attract children.

The role of parents

Some reluctance to grant children the right to independent mobility and opportunities for independent play can be attributed to what Mitchell et al. (2007) describe as "the prevalent social construction of children as dependent, vulnerable and in need of constant adult guidance and supervision" (p. 615). This echoes Prezza's (2007) findings that some parents fear their children will become lost or disoriented if they are outside unaccompanied. Mitchell et al. (2007) identify the social pressures to be seen as a 'good' parent, which is portrayed as being a protective parent. Malone (2007) reports that parents in an Australian study feel under pressure to balance their children's need for independent mobility with the risk of being judged as neglectful parents for not accompanying them. Parents are also concerned about their children acting in an antisocial manner in public (Villanueva, 2014). A study (Bhosale et al., 2015) that included grandparents as respondents demonstrates that parents are justified in feeling that their behaviour is judged and criticised, with a general view from the older generation that "children today are very sheltered or (to quote) 'mollycoddled'." (p. 526). Given that concerns about tangible risks, such as traffic, are entirely legitimate in the context of busier suburban roads and higher childhood accident rates, it appears unfair to judge parents too harshly for being cautious about their children's safety.

Children's attitudes towards parental independent mobility restrictions

However, children appear to be relatively pragmatic about, and accepting of, the mobility restrictions placed upon them, and understand their parents' concerns, even if they don't share them (Bhosale et al., 2015; Brockman et al., 2011; Prezza, 2007). Children do not necessarily abide by their parents' restrictions (Thomson & Philo, 2004). Valentine (2004) argues that children demonstrate greater competence at assessing risk than their parents, using maturity and rationality to consider the possible consequences of independent mobility; in contrast to their parents' over-emotional, irrational, and less reasoned attitudes.

## Theme 5: Encouraging independent mobility and neighbourhood play

Strong and cohesive neighbourhoods

Malone (2007) acknowledges that strengthening communities is an essential strategy to facilitate children enjoying independent mobility. Hillman (2006) writes: "The public must become more involved in taking responsibility for keeping an eye on other children" (p. 66). Noonan et al. (2017) comment: "parents who perceived a high level of neighbourhood social cohesion were less fearful of their child playing outdoors and more willing to let them travel further away from home unsupervised" (p. 1918). Parents who have strong ties to their community feel more confident in the passive surveillance provided by other adults, which reduces their concerns about their children travelling and playing independently (Valentine, 2004; Prezza, 2007; O'Connor & Brown, 2013; Holt et al., 2015; Lin et al., 2017). Aarts, Wendel-Vos, van Oers, van de Goor, and Schuit (2010) discuss a large Dutch study that

identified neighbourhood social cohesion as the strongest factor influencing access to independent outdoor play. A second Dutch study (Karsten, 2005) reported high levels of passive surveillance in specific neighbourhoods.

Enabling children to experience their neighbourhoods independently develops their own sense of local community spirit (Lidén, 2003; Valentine, 2004). This is further supported if children have high levels of trust in other adults in the community, including their friends' parents (Holt et al., 2015). While passive surveillance can reassure parents, the knowledge of actual surveillance - that adults are watching out for them - reassures children that they are safe in their communities (Villanueva, 2014). The presence of adults and children in public spaces contributes to increased feelings of safety, trust, and mutual support within a community (Villanueva, 2014). Children also tend to play outside for longer periods when other people are present in the neighbourhood, (Faulkner et al., 2015).

Freeman and Tranter (2011) highlight the role that community development can play in promoting community cohesion, and identify clubs and community organisations as key facilitators of this shift to stronger communities. This perspective contrasts with a widely-held belief that children's increased participation in organised activities has a negative correlation with independent play.

The built environment

The presence of pedestrian pavements (or footpaths) has a positive correlation with independent mobility and outdoor play (Aarts et al., 2012; Babb et al., 2017). Wheway and Millward (1997) identify a range of urban design features that would help to reduce traffic speeds and levels in residential areas, thus increasing the likelihood of children's independent play. Several studies (Sharmin & Kamruzzaman, 2017; Brockman et al., 2011; Noonan et al., 2016; Tappe et al., 2013; Wheway & Millward, 1997) identify dead end streets and cul-de-sacs as urban design features that offer more opportunities for children to play independently outside. Statistics may show higher incidences of child pedestrian accidents from vehicles entering or exiting properties and on shared driveways, and at the convergence of driveways at the end of cul-de-sacs (Austin, Shepherd & Chambers, 2014), but the literature suggests that parents do not perceive this risk. Christian et al. (2016) note that suburbs with cul-de-sacs offer fewer local destinations and lengthen journey times to affordances. Foster et al. (2015) contend that passive surveillance is enhanced through the presence of walkable street networks, which encourage pedestrian activity and thus increase natural surveillance. Villanueva (2014) asserts that well connected streets facilitate active transport modes and make navigation easier, which encourages children's independent mobility.

This presents a challenge for urban designers: should street networks focus on cul-de-sacs to provide the types of streets that parents perceive (rightly or wrongly) as a safe place for

children to play? Or should street networks support connectivity and walkability, which would indicate less support for the presence of cul-de-sacs? Authors (Noonan et al., 2016; Sharmin & Kamruzzaman, 2017) recognise the contradictory nature of these two urban design goals. Foster et al. (2015) assert that parents welcome walkable streets that encourage greater pedestrian activity, even if those pedestrians are strangers, because the benefits of increased natural surveillance offset the risks presented by strangers. To summarise this paradox: parents are less concerned about strangers if a walkable street network encourages the presence of more strangers.

Freeman and Tranter (2011) acknowledge both the importance of community cohesion, and the role that sympathetic urban design can play as a method of overcoming parental isolation. They identify specific built environment elements, such as low fences between houses, houses that face each other, and houses connected to communal gathering spaces, claiming that this type of urban design encourages meetings between people (Freeman & Tranter, 2011). Broberg et al. (2013) also identify several built environment qualities that support children's independent mobility and access to independent play opportunities, including: residential density levels; sufficient availability of green space; traffic systems that support pedestrian and light traffic use; and easy access to recreation areas.

Technology

Several studies (Thomson & Philo, 2004; Brockman et al., 2011; Underwood, 2011; Nansen et al., 2015; Chaudhury et al., 2017) suggest that parents are more likely to support their children's independent mobility if they can contact them easily by mobile phone, enabling some degree of parental supervision, albeit remotely. Underwood (2011) identifies a range of correlations between mobile phone ownership and children's likelihood of engaging in independent outdoor play.

*The Irish Neighbourhood Play Project* shows that technology has become incorporated into some outdoor play (O'Connor et al., 2017). Kaczmerek, Misiak, Behnke, Dziekan, & Guzik (2017) assert that playing *Pokémon GO* was a particularly effective way of encouraging male gamers to venture outside. Wagner-Greene et al. (2017) claim that participants in this game have significantly increased physical activity levels and experience several additional benefits, however some players have taken physical risks while participating, or have trespassed (Wagner-Greene et al., 2017).

Other factors supporting independent mobility

Owning a dog significantly extends children's territorial ranges (Freeman & Quigg, 2009). Christian et al. (2014) discuss findings that show that many children walk their dog without adult company, and that dog-walking children enjoy greater independent mobility overall. Christian et al. (2014) attribute these findings to a belief that parents' fears of strangers

hurting their children are mitigated by the presence of a dog. Freeman and Quigg (2009) identify local school attendance as the primary determinant of independent mobility and community attachment. The right to travel independently to school is frequently the first mobility licence granted to children, so it is unsurprising that children who cannot enjoy this independent mobility also lack other opportunities for independent travel.

## Theme 6: Teenagers and suburban leisure

Valentine (2004) explains that teenagers seek freedom to spend unsupervised time in public, instead of being expected to attend organised activities with younger children. Cole-Hamilton and Gill (2002) contend that teenagers spend time hanging around on the street because they lack anywhere else to go. Valentine (2004) acknowledges that some teenagers ask for youth clubs and other facilities to provide them with leisure opportunities, but also recognises that most teenagers want freedom to access public space more readily, with less of what she describes as "unreasonable intervention of adults into their social worlds" (p. 87). She also claims that teenagers' preference for spending time in public space after dark is linked to their desire for unsupervised time (Valentine, 2004). Measor and Squires (2000) argue that most teenagers are disinterested in attending youth clubs, noting that teenagers enjoy a broad range of facilities and services that are primarily provided for an adult market, such as shops, cafés, sports facilities, and leisure centres. Broberg et al. (2013) found that Finnish adolescents' and teenagers' leisure preferences showed that playing sports and shopping were among the most popular leisure affordances accessed, and that affordances that encouraged social contact were highly valued. Wheway and Millward (1997) claim that activity-oriented places, like public pools, are particularly popular with teenagers. Chancellor (2004) identifies the need to more accurately identify the type of outdoor spaces that will attract teenage users.

## Theme 7: Gender differences

This literature review refers to the binary terms 'girl' and 'boy' because these are the terms used by all reviewed authors who discussed gender as it pertained to access to play. However, gender non-binary children may have experiences that are not reflected in this discourse.

Several studies claim that boys typically enjoy both more independent mobility, and independent mobility at a younger age (Moore, 1990; Wheway & Millward, 1997; Bringolf-Isler et al., 2010; Pacilli et al., 2013; Villanueva, 2014; Faulkner et al., 2015; Mitchell et al., 2016). Research indicates that girls are typically less active than boys, and play outside less often. Boys enjoy greater territorial range (Veitch et al., 2008; Bringolf-Isler et al., 2010; Oliver et al., 2015; Christian et al., 2016; Mitchell et al., 2016), and typically play outside for longer time periods (Korpela et al., 2002; Thomson & Philo, 2004; Prezza, 2007; Loebach & Gilliland, 2014; Faulkner et al., 2015; Mitchell et al., 2016; Babb et al., 2017). Some parental traffic

concerns appear to be focused on boys' perceived inability to cross roads safely (Villanueva, 2014).

There appears to be stronger feelings of parental concern for the safety and welfare of girls, with a belief that daughters need greater protection (Brown et al., 2008; Pacilli et al., 2013; Senda, 2015). However, extensive British research (Brown et al., 2008) shows that parents who have heightened concerns for their daughters' safety try not to let their concerns curtail their children's freedom. Wheway and Millward (1997) suggest that girls still play a more active role in caring for younger siblings, which may account for their reduced independent mobility.

The difference between girls' and boys' independent mobility levels has been attributed to the self-reinforcing nature of boys' outdoor play (Brown et al., 2008; Brockman et al. 2011): because they seem to be more likely to play outside, they make friends locally, which gives them even greater motivation to play outside. Brockman et al. (2011) identify this as a cause of boys' early spatial dominance in public spaces, which can result in public spaces being 'boy spaces'. They also claim that there are no corresponding 'girl spaces' (Brockman et al., 2011). This can further discourage girls from using those public outdoor spaces for play. Christian et al., (2016) identify that physical activity can be encouraged in girls by offering a greater range of local affordances. Lidén (2003) agrees that certain public spaces become gendered, writing:

> The girls who seek out the sports ground frequently associate the area with masculinity, insecurity and a somewhat uneasy feeling. However, many also have good memories of playing with close friends or teasing the boys. The place is associated with physical experiences, the testing of skills and independence. They connect such places with gendered images of themselves and with events associated with gendered bodies. In this way, boys and girls reassert places as gendered when they become involved in them. (p. 132)

However, other researchers (Korpela et al., 2002; Thomson & Philo, 2004) disagree, insisting that their findings showed equal numbers of boys and girls playing outside, in the same locations, and enjoying the same kind of activities. Brown et al. (2008) also found that parents are more likely to grant permission to play outside if children have a specific play goal in mind, as opposed to merely 'hanging out' with friends. Boys appear to play organised games more often, which might therefore account for their greater independent mobility (Sage et al., 2010; Brown et al., 2008).

Veitch et al. (2008) claim that girls often have autonomy to visit a greater number of destinations unaccompanied. In addition, parents regard girls as more socially mature (Valentine, 2004), with better capacity to organise social engagements with friends (Brown et

al. 2008). Girls access more local affordances when accompanied by friends, and when in densely built areas (Broberg et al., 2013; Chaudhury et al., 2017). Despite having less territorial range within the neighbourhood, girls are more likely to be granted permission to travel further afield, particularly to visit shopping malls (Brown et al. 2008). Parents regard these privatised public realms as safe, monitored locations for girls to socialise with their friends (Brown et al., 2008). It may be that shopping malls are the equivalent 'girl spaces' that Brockman, Fox, and Jago (2011) were unable to identify.

Brown et al. (2008) note that girls often travel with friends, and become more adept at using public transport at a younger age - developing skills to navigate the adult world before their brothers. Chaudhury et al. (2017) present findings the Auckland-based *Kids in the City* study to demonstrate that travelling with peers tends to increase the number of play opportunities children could access. Christian et al., (2016) identify easy access to local bus stops as one way to support girls' independent mobility. In summary, boys may have more local freedom, but girls tend to gain a greater level of expanded freedom.

## Theme 8: Socioeconomic status

Mitchell et al., 2016) links girls' physical activity levels to their socioeconomic status: girls from wealthier households have higher activity levels, and girls from low income households are the least active of all children. Children in low socioeconomic areas may experience higher independent mobility levels and enjoy greater territorial range (Veitch et al., 2008; Oliver et al., 2015). Some studies (Rogers, 2012; Chaudhury, Oliver, Badland, Garrett, & Witten, 2016) suggest that children in these neighbourhoods may be more likely to live near extended family, which provides them with local destinations. Witten and Carroll (2016) claim that children in low socioeconomic neighbourhoods enjoy ***informal*** physical activity opportunities - playing, climbing, walking, or scootering - significantly more often than children in wealthier neighbourhoods. This finding is interpreted as a side effect of their parents being unable to afford organised sports and other extracurricular activities for their children (Ziviani, 2008; Castonguay & Jutras, 2009; Sage et al., 2010). Ziviani (2008) concludes that younger primary school children are less disadvantaged by an inability to participate in organised activities, because all children of that age tend to play similarly, however, older children may have less access to sports facilities. Rigolon's (2017) Colorado study regarding access to parks reveals greater proximity to parks for low socioeconomic households, but less access to the larger, less crowded, better-equipped parks that are typically found in wealthier neighbourhoods.

Valentine (2004) claims that children living in rental accommodation are more likely to enjoy greater freedom to play outside, as are the children of single parents. Other studies (Thomson & Philo, 2004; Aarts et al., 2012) recognise that children from poorer families may be forced outside for play, due to a lack of available inside space. Valentine (2004) accepts that lone

parents often have no choice but to allow unsupervised play because of a shortage of adults in the household. Research by Veitch et al. (2008) and Foster et al (2015) reveals that parents in low socioeconomic areas express greater fears about their children's safety in public, and stronger concerns about a lack of safe places for their children to play. Low socioeconomic neighbourhoods are also more likely to contain a greater number of alcohol outlets, which can influence negative public behaviour, and also tend to have greater incidences of general physical disorder: litter, graffiti, and poorly-maintained amenities (Foster et al., 2015). In general, public spaces in low socioeconomic areas are likely to be of poorer quality (Karsten, 2005; Freeman, 2006; Veitch et al., 2008).

## Theme 9: Ethnicity

There is limited research on the impact of children's ethnicity on their play habits and independent mobility. Oliver et al. (2015), drawing on the *Kids in the City* study, point to higher physical activity levels for Māori and Pacific children, and lower levels for children of Indian, Asian, and other (non-Pākehā) ethnicities. Samoan children's higher levels of independent mobility are also noted by Chaudhury et al., (2016). Lin et al. (2017) map out the different independent mobility obstacles identified by parents of different ethnicities. All ethnic groups identify local parks, reserves, and sports fields as places of concern, but Asian and Indian respondents are most likely to identify specific streets of concern, and are also most likely to highlight the danger posed by traffic (Lin et al., 2017). Samoan and other Pacific respondents hold more frequent concerns about unsupervised youth in public spaces (Lin et al., 2017). Māori, Samoan, Pacific, and Indian respondents are all more likely than Pākehā and Asian respondents to report that they regarded 'everywhere' to be a place of concern (Lin et al., 2017).

Karsten's (2005) study identifies a lack of heterogeneity in neighbourhood play, which reduce opportunities for migrant children to interact and integrate with Dutch children. Rigolon (2017) notes that the Colorado neighbourhoods he studied are largely segregated, with White neighbourhoods enjoying the best and largest parks, and Latino and other ethnic minority groups having much lower access to parks categorised as 'safe'.

## Theme 10: Disability

Few studies acknowledge the impact of disability on children's access to play. Indeed Stafford et al. (2019) acknowledge that we still have limited understanding of how children with impairments move around their own neighbourhoods, and how this excludes them from day to day activities. Cole-Hamilton and Gill (2002) note that disabled children and other children with specific needs may require different types of support to access play affordances, and that there are only limited opportunities for disabled and non-disabled children to play together. The marginalisation of disabled children from public space is also recognised by de Monchaux

(1999), who suggests that exclusion from public space affecting all children presents even more of a challenge for disabled children. Cole-Hamilton and Gill (2002) also highlight a lack of literature evaluating the health benefits of play for disabled children.

## Theme 11: Children's participation in neighbourhood urban design

Children's desire to actively participate in consultation regarding park and playground design, and the frustration they feel when they are not consulted is discussed by O'Brien, (2003) and Jansson et al. (2016). Although Scarlett et al. (2005) acknowledge that some modern playgrounds are designed with extensive input from children, Cole-Hamilton and Gill (202) claim that only limited consultation takes place, and Wheway and Millward (1997) agree, pointing out that they were unable to find any examples of children being involved in a play space planning process from beginning to end. Whitzman and Freeman (2015) point out that most consultations focus on older children and teenagers, and fail to include younger children. Mitchell et al., (2007) criticise what they describe as "the prevalent social construction of children as dependent, vulnerable and in need of constant adult guidance and supervision" (p. 615) seeing this as both as a restriction of children's independent mobility, and as an attitude used to justify children's continued exclusion from the decision-making process.

Several studies (Gleeson et al., 2006; Whitzman & Freeman, 2015; Jansson et al., 2016) claim that children seek opportunities to consult on the design of their communities in general, and not just in the design of child-focused elements. Broberg et al. (2013) recognise the importance of elevating children's needs to equal with adults' needs, writing: "Children should also be seen as abled and active users of their environment and as informants possessing valuable insights into the possibilities and restrictions of different environments." (p. 119). They regard this quest for generational equality as a key task for urban planners (Broberg et al., 2013). Freeman (2006) agrees that children are willing to work with adults regarding planning issues, as long as the consultation process is authentic. She comments: "...they want to be treated as respected partners, to have their views, skills and ideas respected. The issue is … their experiences of working with adults have not always been positive ones…" (p. 82). Thomson and Philo (1997) acknowledge that urban designers of new towns and developments have a unique opportunity to involve children in the design of a play strategy from the outset, but don't often utilise it.

## Conclusion

Findings throughout this literature review suggest that parental attitudes towards independent mobility and play have a far greater impact on all children's activity levels than the number and diversity of play opportunities, or any other environmental factors. Whilst neighbourhood safety concerns (be it from traffic or from strangers) play an important role, the perceived level of neighbourhood and social cohesion is critical in allowing children more

independent mobility. Built environment factors that can address safety concerns and support social cohesion include: the presence of pedestrian footpaths / pavements and pedestrian crossings; traffic calming designs that reduce traffic volume and speed; improvements to driving and parking behaviour that puts pedestrians at risk on the footpath; the provision of appropriate cycling infrastructure; low residential fences and dwellings oriented so that their front doors face each other; easy safe access to a diversity of play spaces, green spaces, communal gathering spaces, local shops and community facilities (such as a library), and bus stops; the involvement of children of all ages in designs; and excellent maintenance of the public realm.

## Bibliography


Aarts, M., de Vries, S., van Oers, H., & Schuit, A. (2012). Outdoor play among children in relation to neighborhood characteristics: a cross-sectional neighborhood observation study. *International Journal Of Behavioral Nutrition And Physical Activity*, *9*(1), 98.

Aarts, M., Wendel-Vos, W., van Oers, H., van de Goor, I., & Schuit, A. (2010). Environmental Determinants of Outdoor Play in Children. *American Journal Of Preventive Medicine*, *39*(3), 212-219.

Audrey, S., & Batista-Ferrer, H. (2015). Healthy urban environments for children and young people: A systematic review of intervention studies. *Health & Place*, *36*, 97-117.

Austin, P. M., Shepherd, M., & Chambers, J. (2014). Children and cars don't mix on driveways. *Planning Quarterly* (193), 18-22.

Babb, C., Olaru, D., Curtis, C., & Robertson, D. (2017). Children's active travel, local activity spaces and wellbeing: A case study in Perth, WA. *Travel Behaviour And Society*, *9*, 81-94.

Badland, H., Donovan, P., Mavoa, S., Oliver, M., Chaudhury, M., & Witten, K. (2015). Assessing neighbourhood destination access for children: development of the NDAI-C audit tool. *Environment And Planning B: Planning And Design*, *42*(6), 1148-1160.

Badland, H., Kearns, R., Carroll, P., Oliver, M., Mavoa, S., & Donovan, P. et al. (2016). Development of a systems model to visualise the complexity of children's independent mobility. *Children's Geographies*, *14*(1), 91-100.

Bartlett, S., Hart, R., Satterthwaite, D., De La Barra, X., & Missair, A. (1999). *Cities for Children*. London: Earthscan Publications.

Bhosale, J., Duncan, S., Schofield, G., Page, A., & Cooper, A. (2015). A pilot study exploring the measurement of intergenerational differences in independent mobility. *Journal Of Transport & Health*, *2*(4), 522-528.

Bornat, D. (2016) *Housing Design for Community Life: Researching how residents use external spaces in new developments*, ZCD Architects and the University of London. Retrieved from: https://www.zcdarchitects.co.uk/housing-design-for-community-life

Boone-Heinonen, J., Casanova, K., Richardson, A., & Gordon-Larsen, P. (2010). Where can they play? Outdoor spaces and physical activity among adolescents in U.S. urbanized areas. *Preventive Medicine*, *51*(3-4), 295-298.

Bringolf-Isler, B., Grize, L., Mäder, U., Ruch, N., Sennhauser, F., & Braun-Fahrländer, C. (2010). Built environment, parents' perception, and children's vigorous outdoor play. *Preventive Medicine*, *50*(5-6), 251-256.

Broberg, A., Kyttä, M., & Fagerholm, N. (2013). Child-friendly urban structures: Bullerby revisited. *Journal Of Environmental Psychology*, *35*, 110-120.

Brockman, R., Fox, K., & Jago, R. (2011). What is the meaning and nature of active play for today's children in the UK?. *International Journal Of Behavioral Nutrition And Physical Activity*, *8*(1), 15.

Brockman, R., Jago, R., & Fox, K. (2011). Children's active play: self-reported motivators, barriers and facilitators. *BMC Public Health*, *11*(1).

Brown, B., Mackett, R., Gong, Y., Kitazawa, K., & Paskins, J. (2008). Gender differences in children's pathways to independent mobility. *Children's Geographies*, *6*(4), 385-401.

Carroll, P., Witten, K., Kearns, R., & Donovan, P. (2015). Kids in the City: Children's Use and Experiences of Urban Neighbourhoods in Auckland, New Zealand. *Journal Of Urban Design*, *20*(4), 417-436.

Carver, A., Veitch, J., Sahlqvist, S., Crawford, D., & Hume, C. (2014). Active transport, independent mobility and territorial range among children residing in disadvantaged areas. *Journal Of Transport & Health*, *1*(4), 267-273.

Carver, A., Watson, B., Shaw, B., & Hillman, M. (2013). A comparison study of children's independent mobility in England and Australia. *Children's Geographies*, *11*(4), 461-475.

Castonguay, G., & Jutras, S. (2009). Children's appreciation of outdoor places in a poor neighborhood. *Journal Of Environmental Psychology*, *29*(1), 101-109.

Chambers, T., Pearson, A., Kawachi, I., Rzotkiewicz, Z., Stanley, J., & Smith, M. et al. (2017). Kids in space: Measuring children's residential neighborhoods and other destinations using activity space GPS and wearable camera data. *Social Science & Medicine*, *193*, 41-50.

Chancellor, B. (2007). Public Spaces for Play: Creating Natural Playspaces for Children 8-12 years in Urban Landscapes that Support Free, Imaginative and Creative Play. *The International Journal Of The Humanities*, *5*(4).

Chaudhury, M., Hinckson, E., Badland, H., & Oliver, M. (2017). Children's independence and affordances experienced in the context of public open spaces: a study of diverse inner-city and suburban neighbourhoods in Auckland, New Zealand. *Children's Geographies*, 1-15.

Chaudhury, M., Oliver, M., Badland, H., Garrett, N., & Witten, K. (2016). Using the Public Open Space Attributable Index tool to assess children's public open space use and access by independent mobility. *Children's Geographies*, *15*(2), 193-206.

Christensen, J., Mygind, L., & Bentsen, P. (2015). Conceptions of place: approaching space, children and physical activity. *Children's Geographies*, *13*(5), 589-603.

Christian, H., Trapp, G., Villanueva, K., Zubrick, S., Koekemoer, R., & Giles-Corti, B. (2014). Dog walking is associated with more outdoor play and independent mobility for children. *Preventive Medicine*, *67*, 259-263.

Christian, H., Zubrick, S., Knuiman, M., Nathan, A., Foster, S., Villanueva, K., & Giles-Corti, B. (2016). Nowhere to Go and Nothing to Do but Sit? Youth Screen Time and the Association With Access to Neighborhood Destinations. *Environment And Behavior*, *49*(1), 84-108.

Cole-Hamilton, I., & Gill, T. (2002). *Making the Case for Play*. London: National Children's Bureau.

de Monchaux, S. (1999). *Child-friendly Environments* (2nd ed.). Sydney: Department of Urban Affairs and Planning.

Depeau, S., Chardonnel, S., André-Poyaud, I., Lepetit, A., Jambon, F., & Quesseveur, E. et al. (2017). Routines and informal situations in children's daily lives. *Travel Behaviour And Society*, *9*, 70-80.

Driskell, D. (2002). *Creating Better Cities with Children and Youth*. London, England: Earthscan.

Faulkner, G., Mitra, R., Buliung, R., Fusco, C., & Stone, M. (2015). Children's outdoor playtime, physical activity, and parental perceptions of the neighbourhood environment. *International Journal Of Play*, *4*(1), 84-97.

Foster, S., Wood, L., Francis, J., Knuiman, M., Villanueva, K., & Giles-Corti, B. (2015). Suspicious minds: Can features of the local neighbourhood ease parents' fears about stranger danger?. *Journal Of Environmental Psychology*, *42*, 48-56.

Freeman, C. (2006). Colliding Worlds. In B. Gleeson & N. Sipe, *Creating Child Friendly Cities*. London ; New York: Routledge.

Freeman, C., & Quigg, R. (2009). Children's Lives: A Dunedin Study. *Childrenz Issues*, *13*(1).

Freeman, C., & Tranter, P. (2011). *Children and Their Urban Environment*. Hoboken: Taylor and Francis.

Gilliam, L. (2003). The local lives of Belfast children. In K. Fog Olwig & E. Gulløv, *Children's Places - cross-cultural perspectives*. London; New York: Routledge.

Gleeson, B., Sipe, N., & Rolley, K. (2006). Pathways to the child friendly city. London ; New York: Routledge.

Heerwagen, J., & Orians, G. (2002). The Ecological World of Children. In P. Kahn, Jr & S. Kellert, *Children and Nature*. Cambridge, Mass.: MIT Press.

Hendricks, B. (2001). *Designing for Play*. Aldershot, England: Ashgate Publishing.

Hillman, M. (2006). Children's rights and adults' wrongs. *Children's Geographies*, *4*(1), 61-67.

Holt, N., Lee, H., Millar, C., & Spence, J. (2015). 'Eyes on where children play': a retrospective study of active free play. *Children's Geographies*, *13*(1), 73-88.

Jansson, M., & Persson, B. (2010). Playground planning and management: An evaluation of standard-influenced provision through user needs. *Urban Forestry & Urban Greening*, *9*(1), 33-42.

Jansson, M., Sundevall, E., & Wales, M. (2016). The role of green spaces and their management in a child-friendly urban village. *Urban Forestry & Urban Greening*, *18*, 228-236.

Kaczmarek, L., Misiak, M., Behnke, M., Dziekan, M., & Guzik, P. (2017). The Pikachu effect: Social and health gaming motivations lead to greater benefits of Pokémon GO use. *Computers In Human Behavior*, *75*, 356-363.

Karsten, L. (2005). It all used to be better? Different generations on continuity and change in Urban Children's Daily Use of Space. *Children's Geographies*. 3, 275-290.

Kearns, R., Carroll, P., Asiasiga, L., & Witten, K. (2016). Variegated Nature of Play for Auckland Children. In B. Gwanas, J. Horton & T. Skelton, *Play and Recreation, Health and Wellbeing*. Singapore: Springer.

Korpela, K., Kyttä, M., & Hartig, T. (2002). Restorative Experience, Self-Regulation, and Children's Place Preferences. *Journal Of Environmental Psychology*, *22*(4), 387-398.

Lidén, H. (2003). Growing up in urban Norway. In K. Fog Olwig & E. Gulløv, *Children's Places - cross-cultural perspectives*. London; New York: Routledge.

Lin, E., Witten, K., Oliver, M., Carroll, P., Asiasiga, L., Badland, H., & Parker, K. (2017). Social and built-environment factors related to children's independent mobility: The importance of neighbourhood cohesion and connectedness. *Health & Place*, *46*, 107-113.

Loebach, J., & Gilliland, J. (2014). Free Range Kids? Using GPS-Derived Activity Spaces to Examine Children's Neighborhood Activity and Mobility. *Environment And Behavior*, *48*(3),

Loebach, J., & Gilliland, J. (2016). Neighbourhood play on the endangered list: examining patterns in children's local activity and mobility using GPS monitoring and qualitative GIS. *Children's Geographies*, *14*(5), 573-589.

Malone, K. (2007) The Bubble-wrap Generation: children growing up in walled gardens, *Environmental Education Research*, 13(4), 513-527.

Measor, L., & Squires, P. (2000). *Young People and Community Safety*. Aldershot, England: Ashgate Publishing.

Ministry of Health. (2017). *Helping children (5-12 year olds) be more active*. Wellington: NZ Government.

Mitchell, C., Clark, A., & Gilliland, J. (2016). Built Environment Influences of Children's Physical Activity: Examining Differences by Neighbourhood Size and Sex. *International Journal Of Environmental Research And Public Health*, *13*(1), 130.

Mitchell, H., Kearns, R., & Collins, D. (2007). Nuances of neighbourhood: Children's perceptions of the space between home and school in Auckland, New Zealand. *Geoforum*, *38*(4), 614-627.

Moore, R. (1990). *Childhood's Domain* (2nd ed.). Berkeley, CA: MIG Communications.

Moran, M., Plaut, P., & Merom, D. (2017). Is the Grass Always Greener in Suburban Neighborhoods? Outdoors Play in Suburban and Inner-City Neighborhoods. *International Journal Of Environmental Research And Public Health*, *14*(7), 759.

Morrow, V. (2003). "No ball games": children's views of their urban environments. *Journal Of Epidemiology & Community Health*, *57*(4), 234-234.

Nansen, B., Gibbs, L., MacDougall, C., Vetere, F., Ross, N. & Mckendrick, J. (2014). Children's interdependent mobility: compositions, collaborations and compromises. *Children's Geographies.* 13, 1-15.

Noonan, R., Boddy, L., Fairclough, S., & Knowles, Z. (2017). Parental perceptions on children's out-of-school physical activity and family-based physical activity. *Early Child Development And Care*, *187*(12), 1909-1924.

Noonan, R., Boddy, L., Fairclough, S., & Knowles, Z. (2016). Write, draw, show, and tell: a child-centred dual methodology to explore perceptions of out-of-school physical activity. *BMC Public Health*, *16*(1).

O'Brien, M. (2003). Regenerating children's neighbourhoods. In P. Christensen & M. O'Brien, *Children in the City*. London, England: Routledge.

O'Connor, D., McCormack, M., & O'Rourke, V. (2017). *Boys and girls come out to play: Gender differences in children's play patterns*. Presentation, 9th International Conference on Education and New Learning Technologies.

O'Connor, D., O'Rourke, V., Robinson McGunnigle, C., & McCormack, M. (2017). *The influences of opportunity. Differences in children's play choices across diverse communities in Ireland*. Presentation, 11th International Technology, Education and Development Conference.

O'Connor, J., & Brown, A. (2013). A qualitative study of 'fear' as a regulator of children's independent physical activity in the suburbs. *Health & Place*, *24*, 157-164.

Oliver, M., Mavoa, S., Badland, H., Parker, K., Donovan, P., & Kearns, R. et al. (2015). Associations between the neighbourhood built environment and out of school physical activity and active travel: An examination from the Kids in the City study. *Health & Place*, *36*, 57-64.

Pacilli, M., Giovannelli, I., Prezza, M., & Augimeri, M. (2013). Children and the public realm: antecedents and consequences of independent mobility in a group of 11–13-year-old Italian children. *Children's Geographies*, *11*(4), 377-393.

Page, A., Cooper, A., Griew, P., & Jago, R. (2010). Independent mobility, perceptions of the built environment and children's participation in play, active travel and structured exercise and sport: the PEACH Project. *International Journal Of Behavioral Nutrition And Physical Activity*, *7*(1), 17.

Prezza, M. (2007). Children's Independent Mobility: A Review of Recent Italian Literature. *Children, Youth And Environments*, *17*(4), 293-318.

Rasmussen, K. (2004). Places for Children – Children's Places. *Childhood*, *11*(2), 155-173.

Rigolon, A. (2017). Parks and young people: An environmental justice study of park proximity, acreage, and quality in Denver, Colorado. *Landscape And Urban Planning*, *165*, 73-83.

Rogers, M. (2012). "They are there for you": The Importance of Neighbourhood Friends to Children's Well-Being. *Child Indicators Research,*, *5*(3).

Scarlett, W., Naudeau, S., Salonius-Pasternak, D., & Ponte, I. (2005). *Children's Play*. Thousand Oaks. Calif.: Sage Publications.

Senda, M. (2015). Safety in public spaces for children's play and learning. *IATSS Research*, *38*(2), 103-115.

Sharmin, S., & Kamruzzaman, M. (2017). Association between the built environment and children's independent mobility: A meta-analytic review. *Journal Of Transport Geography*, *61*, 104-117.

Shepherd, M., Austin, P. & Chambers, J. (2010) Driveway Runover, the influence of the built environment: a case control study, *Journal of Paediatrics and Child Health,* 46 (12) 760-767

Smith, M., Amanna, R., Cavadino, A., Raphael, D., Kearns, R., Mackett, R., Mackay, L., Carroll, P., Forsyth, E., Mavoa, S., Zhao, J., Ikeda, E. & Witten, K. (2019). Children's Transport Built Environments: a mixed methods study of associations between perceived and objective measures and relationships with parent licence for independent mobility in Auckland, New Zealand. *International Journal of Environmental research and Public Health*, 16, 1361.

Stafford, L., Adkins, B. and Franz, J. (2019) Bounded at the Driveway's Edge: body-space tensions encountered by children with mobility impairments in moving about the neighbourhood street, *Children's Geographies*
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Tappe, K., Glanz, K., Sallis, J., Zhou, C., & Saelens, B. (2013). Children's physical activity and parents' perception of the neighborhood environment: neighborhood impact on kids study. *International Journal Of Behavioral Nutrition And Physical Activity*, *10*(1), 39.

Thomson, J., & Philo, C. (2004). Playful spaces? a social geography of children's play in Livingston, Scotland. *Children's Geographies*, *2*(1), 111-130.

Tranter, P. (2006). Overcoming social traps. In B. Gleeson & N. Sipe, *Creating Child Friendly Cities*. London ; New York: Routledge.

Underwood, C. (2011). *Children's Independent Mobility : and the Mobile Phone: 8 to 12 year olds*. Melbourne: Australian Council for Educational Research.

Valentine, G. (2004). *Public Space and the Culture of Childhood*. Aldershot, England: Ashgate Publishing.

Veitch, J., Salmon, J., & Ball, K. (2007). Children's Perceptions of the Use of Public Open Spaces for Active Free-play. *Children's Geographies*, *5*(4), 409-422.

Veitch, J., Salmon, J., & Ball, K. (2008). Children's active free play in local neighborhoods: a behavioral mapping study. *Health Education Research*, *23*(5), 870-879.

Veitch, J., Salmon, J., Deforche, B., Ghekiere, A., Van Cauwenberg, J., Bangay, S., & Timperio, A. (2017). Park attributes that encourage park visitation among adolescents: A conjoint analysis. *Landscape And Urban Planning*, *161*, 52-58.

Villanueva, K., Giles-Corti, B., Bulsara, M., Trapp, G., Timperio, A., McCormack, G., & Van Niel, K. (2014). Does the walkability of neighbourhoods affect children's independent mobility, independent of parental, socio-cultural and individual factors?. *Children's Geographies*, *12*(4), 393-411.

Wagner-Greene, V., Wotring, A., Castor, T., Kruger, J., Mortemore, S., & Dake, J. (2017). Pokémon GO: Healthy or Harmful?. *American Journal Of Public Health*, *107*(1).

Walsh, P. (2006). Creating child friendly playspaces. In B. Gleeson & N. Sipe, *Creating Child Friendly Cities*. London ; New York: Routledge.

Wang, F., Ruan, H., Chieh Wang, H., Zong, Y., & Zhen, F. (2017). Create, control and have territories or secret places, *Habitat International*, *66*, 125-134.

Wheway, R., & Millward, A. (1997). *Child's play: Facilitating play on housing estates*. Coventry, England: Chartered Institute of Housing.

Whitzman, C., & Freeman, C. (2015). Young Voices, Vital Perspectives: Designing with Children in Asia-Pacific Cities. *Journal Of Urban Design*, *20*(4), 411-416.

Witten, K., & Carroll, P. (2016). Children's Neighborhoods: Places of Play or Spaces of Fear?. In K. Nairn & P. Kraftl, *Space, Place and Environment*. Singapore: Springer.

Ziviani, J., Wadley, D., Ward, H., Macdonald, D., Jenkins, D., & Rodger, S. (2008). A place to play: Socioeconomic and spatial factors in children's physical activity. *Australian Occupational Therapy Journal*, *55*(1), 2-11.

## Part 2: Are Suburban Neighbourhoods Meeting the Needs of Older People?

### Introduction

Older people present a unique array of needs within neighbourhoods. As ageing societies continue to expand globally, researchers are attempting to further understand the performance of neighbourhoods and how they are meeting the needs of older people (Vine, Buys, & Aird, 2012; Temelová & Dvořáková, 2012; Mahmood & Keating, 2012; Farrelly, 2014; Alidoust, Gordon, & Bosman, 2014). Recognising that the design of neighbourhoods can either encourage or discourage older people to embrace the neighbourly resources and amenities available to them, the quality and liveability of neighbourhoods needs to improve to accommodate older people (Vine et al., 2012; Mitchell et al., 2003; Chui, 2001). Worldwide, governments and international organisations are attempting to establish age-appropriate policies, designs and living initiatives such as ageing in place, which support and enable older people to continue living in their own homes and familiar neighbourhood environments (Parra et al., 2010; Elsawahli, Shah Ali, Ahmad, & Al-Obaidi, 2017). For New Zealand, it is predicted that by 2051 older people over 65 will make up approximately 25 percent of the population, meaning implementation of these design elements and living initiatives will be needed to better support the well-being of the older population (Ministry of Health, 2002; Ministry of Social Policy, 2000; Ministry of Health, 2016).

### Theme 1: Functionality Changes Experienced by Older People

The process of ageing brings with it changes that alter the way older people live their daily lives. It is common for the range of environments that older people frequently visit and utilise, to shrink to the area of their residential neighbourhood. In response to this, it is important that neighbourhoods are capable of accommodating the needs of all older people, no matter what their cognitive or physical abilities.

It is expected that there will be a decrease in the everyday rhythms of older people as a result of age-related changes they are likely to encounter (Lager, Van Hoven, & Huigen, 2016). These changes come in a variety of forms including the slowing of cognitive processing, an increase in the difficulty of physical activities, and a decline in the ease of mobility (Ribeiro, Mitchell, Sá Carvalho, & de Fátima de Pina, 2013; Vine et al., 2012; Marquet & Miralles-Guasch, 2015; Dujardin, Lorant, & Thomas, 2014; Milton et al., 2015; Burton & Mitchell, 2006). These changes lead to older people being an extremely heterogeneous group, where every individual has a unique set of attributes (Burton & Mitchell, 2006). It is also during this time that the relationship of disability and older age illustrates its strongest bond (Frye, 2014). These changes can cause minor or major problems for older people when they are attempting to continue functioning independently both at home, and when venturing elsewhere (Burton & Mitchell, 2006).

As a result of these changes older people tend to decrease the area within which they spend the majority of their time, to the confines of their local and familiar neighbourhood (Vine et al., 2012; Temelová & Dvořáková, 2012; Gong, Gallacher, Palmer, & Fone, 2014; Weiss, Maantay, & Fahs, 2010; Föbker & Grotz, 2006; Alidoust, Bosman, Holden, Shearer, & Shutter, 2017). This sees older people becoming dependent on, and vulnerable to, the conditions and quality of their neighbourhood (Ribeiro et al., 2013; Dujardin et al., 2014; Marquet & Miralles-Guasch, 2015; Föbker & Grotz, 2006; Wiles, Leibing, Guberman, Reeve, & Allen, 2011). For older people, the neighbourhood becomes an integral determinant for their independence, health and well-being (Ribeiro et al., 2013; Vine et al., 2012; Temelová & Dvořáková, 2012; Milton et al., 2015; Föbker & Grotz, 2006; Van Dijk, Cramm, Van Exel, & Nieboer, 2015; Van Der Greft, Musterd, & Thissen, 2016; Loo, Mahendran, Katagiri, & Lam, 2017; De Donder, Buffel, Dury, De Witte, & Verte, 2013; Luz, Cesar, Lima-Costa, & Proietti, 2011; Alidoust et al., 2014).

The elements of design and planning that have created the neighbourhood then shape the way older people interact with their local environment. This can either support or oppose their personal needs (Marquet & Miralles-Guasch, 2015; Burton & Mitchell, 2006). If the neighbourhood design is age-friendly and suits the varying needs of older people, it will be beneficial for the social, physical, and health determinants of their quality of life (Van Dijk et al., 2015). If governments want to encourage older people to continue living independent and active lives, the design and planning of neighbourhoods must take into consideration their specific needs, a point which Frye (2014) believes is not currently being embraced as fully as it should be.

It is important to have liveable neighbourhoods for older people, however there are many people from other age groups that also need to be able to be comfortable in the same area. Temelová & Dvořáková (2012) explore Mangen's (2004) concern of neighbourhoods being designed with age-based provisions that are too specific and do not recognise the needs of others who will be using the same spaces (Biggs & Carr, 2015). This can create a 'generational divide' within the neighbourhood, such as a park designed with only children in mind and no provision for the needs of older people such as benches to rest on (Lager et al., 2016); or a park designed for older people with no space for children to play (Mitchell et al., 2003; Burton & Mitchell, 2006). It is vital that neighbourhood designs cater to a diverse range of ages and abilities, providing sustainable environments for everyone through all stages of their lives (Temelová & Dvořáková, 2012; Milton et al., 2015; Taylor & Buys, 2014; Mahmood & Keating, 2012; Strobl, Maier, Ludyga, Mielck, & Grill, 2016).

Some researchers argue that the standard provision of designs that fit the needs of a typical healthy young white male must be questioned (Mitchell et al., 2003; Burton & Mitchell, 2006;

Biggs & Carr, 2015; Strobl et al., 2016), instead finding designs that are user friendly for everyone, including the vulnerable groups of children, older people, and those with disabilities (Lestan, Erzen, & Golobic, 2014). Biggs and Carr (2015) conclude that 'a functioning and sustainable urban space entails taking shared and distinctive generational requirements into account, negotiating diverse and possibly contradictory uses and designing structures that can stand the test of generational time' (p. 109). Coincidently, research has found that the introduction of design elements that are intended to benefit older people also produce benefit for other users in the neighbourhood (Sugiyama & Ward Thompson, 2007; Mitchell et al., 2003; Biggs & Carr, 2015).

## Theme 2: Designing a Neighbourhood

There are three components that come together to form the basis of a neighbourhood; the physical and built environment, the social connections and interactions that occur within in it, and the policies that work in association with it. When examining the performance of neighbourhoods the physical and policy roles are significant in determining the success of meeting the needs of older residents. One of the vital needs for older people in neighbourhoods is ease of accessibility. With an increasing number of older people suburban neighbourhood design needs to encompass this necessity of accessibility.

As discussed by Alidoust, Holden, & Bosman (2014), physical, policy, and social environments interact with one another to form the neighbourhoods within which we reside. A neighbourhood cannot be evaluated without acknowledging each of these components. When assessing neighbourhoods, older people tend to consider the social relationships they have within them (Van Dijk, 2015), however it is the physical and policy aspects which form the original neighbourhood base within which the social mechanisms develop (Jackisch, Zamaro, Green, & Huber, 2015). If the initial physical and policy concepts are effective, they then provide the environment for facilitating social connections. Not only do the physical and policy environments assist in shaping positive social interactions, they also influence the health and well-being of the neighbourhood residents (Luz et al., 2011; Chui, 2001; Novek & Menec, 2014).

There are increasing numbers of older people living in low to medium density suburban areas. Zegras, Lee, & Ben-Joseph (2012) found that in the United States the majority of older people are living in the suburbs, and Australian research showed that older Australians tend to also live in low-density suburbs (Taylor & Buys, 2014; Zeitler & Buys, 2015). Accessibility for older people varies across density levels. In high density areas older people are more likely to use the physically active process of walking for getting around and accessing amenities (Li, Fisher, Brownson, & Bosworth, 2005; Cao, Mokhtarian, & Handy, 2010). In low to medium density suburbs there is lower evidence of social participation in the neighbourhood and higher

reliance on the use of cars for mobility (Zegras et al., 2012; Zeitler & Buys, 2015; Patterson & Chapman, 2004). This has led to the conclusion that thriving urban neighbourhoods with nearby amenities, reliable public transport options, and user-friendly built environments are more suitable for older people than lower density neighbourhoods such as suburbs located away from facilities and amenities (Maltz, Hunter, Cohen, & Wright, 2014; Föbker & Grotz, 2006; Nyunt et al., 2015; Marquet & Miralles-Guasch, 2015).

If a neighbourhood does not have ease of use and good accessibility older people can find themselves living in environments that cause stress, fear, and isolation from neighbourhood amenities and other residents (Vine et al., 2012; Curtis & Punter, 2004; Föbker & Grotz, 2006; Alidoust et al., 2014; Burton & Mitchell, 2006). Alternatively, older people may find they need to travel elsewhere in order to comfortably fulfil their day-to-day tasks, a process that will only become more difficult with the ageing loss of mobility (Cao et al., 2010; Alidoust et al., 2014). The neighbourhood design process needs to involve careful thought around "place making", ensuring that the built environment produced will be accessible, well connected, complementary and beneficial to the quality of life of older people and other residents (Elsawahli et al., 2017; Mahmood & Keating, 2012; Lawhon, 2003; Novek & Menec, 2014; Burton & Mitchell, 2006).

Distance from facilities and amenities is a significant issue for older people and neighbourhood design. Being in close proximity to supermarkets, parks, post offices etc, is identified as a desirable quality for age-friendly neighbourhoods, creating positive influence on health and quality of life (Novek & Menec, 2014; Sugiyama et al., 2014). As well as proximity increasing the accessibility for residents, it increases the likelihood that older people will be active when utilising the resources available and socialise with other residents they may encounter on the way (Nyunt et al., 2015; Li et al., 2005; Sugiyama & Ward Thompson, 2007; Barnett, Cerin, Ching, Johnston, & Lee, 2015; Chong, Yow, Loo, & Patrycia, 2015).

Traditional neighbourhood design theories are becoming influential when considering the layout of age-friendly neighbourhoods. These designs incorporate walker-friendly grid-like street layouts, as opposed to cul-de-sacs often found in suburban neighbourhoods (Sugiyama et al., 2014; Patterson & Chapman, 2004; Burton & Mitchell, 2006; Zegras et al., 2012; Lawhon, 2003). The traditional design encourages accessibility and pedestrian mobility throughout, with the incorporation of open and green outdoor areas for use by residents of all ages and abilities (Cao et al., 2010; Lestan et al., 2014; Sugiyama & Ward Thompson, 2007). The recommendation of simple and intuitive design elements is also made, recognising that such features have the greatest user-friendly outcomes (Mahmood & Keating, 2012).

## Theme 3: Ageing in Place

Ageing in place sees older people continue to live independently in their own home within the familiar surroundings of their neighbourhood. Ageing in place allows for stability in living arrangements and potentially provision of nearby amenities (Mahmood & Keating, 2012). Holding onto independence is a priority for the majority of older people, and ageing in place allows this to happen (Taylor & Buys, 2014; Harris, 2013; Zeitler & Buys, 2015; Wiles, 2011; Davey, 2006). As well as maintaining independence, ageing in place positively influences the health and well-being of older people (Vine et al., 2012).

The majority of older people in New Zealand choose to age in place, staying in their own homes for as long as possible (Davey, 2006). As a result, it is important to consider how well the characteristics of the built environment fit the needs of older people (Strobl et al., 2016). It is the strength and weaknesses of the neighbourhood design that determine how suitable an environment is for ageing in place (Vine et al., 2012, Föbker & Grotz, 2006). Safety, access to nearby facilities and services, well maintained pavements, suitable street layouts, mobility options, user friendly green spaces, and the opportunity for neighbourly relationships to flourish all contribute to making the ageing in place neighbourhoods more accessible and inclusive for older people (Temelová & Dvořáková, 2012; Dujardin et al., 2014; Van Dijk, 2015; Van Der Greft, 2016; Föbker & Grotz, 2006; Zeitler & Buys, 2015). Ageing in place neighbourhoods have also shown that if you create environments that are safe and easy to navigate, older people will have the confidence to get out and about, and be both socially and physically active in their neighbourhood (Marquet & Miralles-Guasch, 2015;Ward Thompson, Curl, Aspinall, Alves, & Zuin, 2014; Nyunt et al., 2015; Farrelly, 2014; Burton & Mitchell, 2006).

An alternative living option that older people are presented with is retirement homes or care facilities. Despite these options limiting the continuation of independent living, research in Canada has shown that there are some who prefer additional support from those around them as they age (Adams & Chivers, 2016). This research also highlighted the architectural expression and symbol of old age that these buildings present within neighbourhoods. The loss of independence that people associate with retirement and care homes can work as encouragement for older people to remain ageing in place with perceived greater control of their own existence (Adams & Chivers, 2016; Davey, 2006).

A consensus can be identified for the benefit that ageing in place brings for governments. This way of living reduces the pressure that is being placed on governments worldwide as populations continue to age (Vine et al., 2012; Davey, 2006; Ministry of Social Policy, 2000). Ageing in Place lowers the need to provide age specific retirement and care facilities which have large economic implications (Vine et al., 2012; Wiles et al., 2011). Many Western countries have policies that support the long term independent living of older people (Lager

et al., 2016). The Organization for Economic Co-operation and Development and its member countries have been providing continuing support for the concept since the early 90s (Davey, 2006; Dujardin et al., 2014), and the World Health Organisation (WHO) also supports the notion of ageing in place and the active ageing and physical activity it can produce (Van Dijk, 2015).

## Theme 4: The Meaning of Home for Older People

When considering where to live at an older age, people will want to ensure their home environment is suitable for their personal needs; be it a home that they have lived in for some time or one that they move to. For some older people they will be continuing to live in a house that they have been in for some time, other people will be choosing a new location for this segment of their lives. In both instances, it is preferable that the houses and their surrounding neighbourhoods are age-friendly and suit the age-specific needs of the residents.

Providing a definition of home will present varying responses from different people. For many, home refers only to the physical property in which they live. However, as discussed by Wiles et al. (2009), older people tend to believe home encompasses more than just their house, it includes the people and places that they are familiar with in their neighbourhood (Buckenberger, 2012). When considered alongside Buckenberger's findings that older people place higher value in the tangible elements of their neighbourhood compared to the younger preference of physical qualities, this is not surprising.

It is common for suburban neighbourhoods to have elements of social connection and neighbourliness evident throughout. These community interactions can positively impact on the day-to-day well-being of older people and broaden what they perceive to be their home (Rogers & Sukolrantanametee, 2009; Wiles et al., 2009; Wilkerson, Carlson, Yen, & Michael, 2012; Kweon, Sullivan, & Wiley, 1998). Positive social interaction can assist in creating a sense of place within neighbourhoods (Buckenberger, 2012).

The physical attributes of a house can play a big part in connecting older people to the community and neighbourhood outside. Increasing attention is being given to the roles that front porches, decks, and gardens can play in social exchanges (Rogers & Sukolrantanametee, 2009; Buckenberger, 2012; Wilkerson et al., 2012). If older people are sitting on their porch or deck, or are in their gardens observing their surroundings, they are able to converse with passer-by's or keep a friendly eye on the properties around them. These semi-private 'surveillance spots' can also be located indoors connecting the older residents to the neighbourhood and contributing to the sense of community in the area (Wilkerson et al., 2012; Rogers & Sukolrantanametee, 2009; Wiles et al., 2009).

## Theme 5: Suitable Characteristics of the Built Environment for Older People

There is a large body of research which has looked into the most important, beneficial, and suitable characteristics of the built environment in neighbourhoods that are home to older people. These characteristics fall into three main categories; barriers of the built environment, influences on mobility and active lifestyles, and the role of the outdoors and greenspace.

Barriers

Much of this research has involved older people identifying the physical barriers they perceive to be influencing their neighbourhoods. The condition and terrain of pedestrian areas and streetscapes, and the quality and provision of elements such as seating, clear signage, time allocation for crossing intersections, street lighting, and road layouts were frequently mentioned as critical factors that can either enhance or hinder exploration and utilisation of neighbourhood resources (Vine et al., 2012; Dujardin et al., 2014; Ward Thompson et al., 2014; Sugiyama & Ward Thompson, 2007; Aspinall et al., 2010; Frye, 2014; Kerr et al., 2014; Strobl et al., 2016; Patterson & Chapman, 2004; De Donder et al., 2013; Chippendale & Boltz, 2015; Burton & Mitchell, 2006; Wiles, 2011; Ministry of Social Policy, 2000). Older people have stated that influence of these barriers can cause their neighbourhoods to become more restrictive as they continue to age (Milton et al., 2015; Biggs & Carr, 2015; Kerr et al., 2014; Strobl et al., 2016; Anmear, Cushman, & Gidlow, 2009).

Proximity and accessibility

The proximity and accessibility of resources is frequently mentioned across neighbourhood design research. If amenities such as shops, health services, and open spaces are located nearby, the liveability of the neighbourhood for older people is improved, encouraging higher levels of interaction with the local environment (Vine et al., 2012; Temelová & Dvořáková, 2012; Marquet & Miralles-Guasch, 2015; Fokkema, Gierveld, & Nijkamp, 1996; Zeitler & Buys, 2015; Nyant et al., 2015; Novek & Menec, 2014; Strobl et al., 2016; De Donder et al., 2013). Local and accessible neighbourhood resources also positively influence social interaction and relationships between residents, leading to the formation of neighbourly connections (Mahmood & Keating, 2012). Accessibility to greenspaces such as parks, is one of the main concerning issues identified by both older people and fellow neighbourhood residents (Temelová & Dvořáková, 2012; Van Dijk, 2015; De Donder et al., 2013). The importance of the close proximity to amenities grows as older people continue to age and they become less mobile or able to drive themselves elsewhere (Vine et al., 2012; Strobl et al., 2016).

Safety

Participation is highly influenced by older people's perceptions of safety (Alidoust et al., 2014). With heightened awareness and anxious tendencies, older people may become consumed by concerns of safety both at home and around the local neighbourhood (Temelová & Dvořáková,

2012; Föbker & Grotz, 2006; Strobl et al., 2016). In *Inclusive Urban Design: Streets for Life*, Burton and Mitchell (2006) define neighbourhood safety as 'the extent to which streets enable people to use, enjoy and move around the outside environment without fear of tripping or falling, being run-over or being attacked' (p. 115). The work of De Donder et al. (2013) found that the majority of safety concerns were linked to incivilities and disorder within the neighbourhood, yet something as simple as observed design quality of a neighbourhood can also influence safety perceptions. Keeping these concerns in mind when designing neighbourhood components, such as pedestrian areas, may assist in reducing the worries held by older residents (Michael, Green, & Farquhar, 2006; Mitchell et al., 2003; Van Dijk, 2015; De Donder et al., 2013).

Improvements

The barriers identified by older people are often easy to fix through minor changes, or simple ongoing maintenance of the built environment. Without ongoing maintenance, neighbourhoods which once catered well to the needs of older people can become unsuitable (Vine et al., 2012; Ward Thompson, 2014; Sugiyama & Ward Thompson, 2007; Aspinall et al., 2010; Barnett et al., 2015; Chippendale & Boltz, 2015; Burton & Mitchell, 2006). The need for, and implementation of, traffic-calming methods to improve pedestrian safety around roads is frequently raised by older people (Michael et al., 2006; Lehning, 2014). The high existence of discussions around traffic-calming should alert planners and designers of the need to include these considerations in the early stages of neighbourhood design (Burton & Mitchell, 2006). If this consideration results in a higher number of all residents being active within the neighbourhood (not just older people) this will lead to increasing their quality of life (Gong et al., 2014; Sugiyama & Ward Thompson, 2007; Lehning, 2014).

However, researchers, urban planners and designers beware. There is a general consensus throughout research that older people report being happy with what their neighbourhoods have to offer, and that they meet their needs (Vine et al., 2012; Föbker & Grotz, 2006; Zeitler & Buys, 2015; Zeitler & Buys, 2015; Wiles et al., 2011). It is only when the older people are encouraged to delve deeper into evaluations, that barriers are mentioned. For example, Vine et al. (2012) explain that there is a desire to have neighbourhood amenities nearby, however the lack of them does not lower the neighbourhood satisfaction levels of older people.

## Theme 6: Mobility and Active Living for Older People

The level of mobility possessed by older residents is dependent on two factors, their individual physical and mental state, and the availability of mobility friendly options incorporated into the design of their neighbourhood. It is common for research that is looking at the mobility of older people in their neighbourhoods to be discussed in association with levels of activity. Living an active lifestyle with functional mobility positively influences the independence and

the quality of life of older people (Frye, 2014; Kerr et al., 2014; Novek & Menec, 2014; Ministry of Social Policy, 2000).

The utilisation of motor vehicles allows older people to be independently mobile when making trips to places both in and outside their neighbourhoods (Milton et al., 2015; Zeitler & Buys, 2015; Cao et al., 2010). Older people's dependence on motor vehicles is the highest it has ever been (Cao et al., 2010; Vine et al., 2012). This mobility method is extremely popular, especially in the United States where 87 percent of older adults use their car for most of their trips (Zegras et al., 2012). Barriers of accessibility to local amenities influence older people's high use of motor vehicles, however for many older residents, driving has been a normal part of their lives and this has continued as they have aged (Vine et al., 2012; Van Dijk, 2015). As they continue to age their ability to safely control motor vehicles decreases, leading to a higher reliance on alternative mobility options within their neighbourhoods (Vine et al., 2012; Marquet & Miralles-Guasch, 2015; Milton et al., 2015; Van Dijk et al., 2015; Cao et al., 2010). The inability to no longer drive without a car is seen as a life-changing event by many older people (Davey, 2004).

While motor vehicles are the favoured mobility mode, it is important that neighbourhoods cater to the needs of non-car drivers (Zeitler & Buys, 2015). If older people choose to utilise the walking-friendly mobility options in their neighbourhoods, they can gain benefit for their well-being and quality of life (Marquet & Miralles-Guasch, 2015; Patterson & Chapman, 2004; Loo et al., 2017). This supports the concept of active ageing established by WHO in 2002, as it incorporates daily activities with a healthy lifestyle that includes physical activity (Michael et al., 2006; Biggs & Carr 2015). It is expected that active ageing will be more achievable if neighbourhood amenities are located nearby; pedestrian areas, footpaths and road-crossings are in good condition; environments are user-friendly and safe; and the neighbourhood is exciting and interesting to explore (Michael et al., 2006; Ward Thompson, 2014; Frye, 2014). However a high number of motor vehicle users create situations of safety concern for pedestrians. Older people have a high representation in pedestrian accident figures for New Zealand (Fokkema et al., 1996; Ministry of Social Policy, 2000). These are especially a concern in the growing number of shared-surface transport spaces that are being implemented internationally (Frye, 2014) and locally. In these situations, not only do older people have to be thinking about their own movements, but they have to be aware of other vehicles around them.

The alternative mobility option of public transport does not have as strong a following or utilisation rate. Vine et al. (2012) believe that the low use of public transport by older people is linked to negative impressions of the actual services available, rather than how available and reliable they are. Factors such as the attitude of public transport drivers, and the accessibility associated with getting on and off vehicles used for public transport can deter

older people from using them (Frye, 2014). The introduction of seniors "travel for free" cards may encourage greater usage. Community transport options in the UK targeted directly for older people appear to provide an essential transport option. It is important that user-friendly public transport options are available for older people as they may need to access facilities and services that cannot be found in their suburban neighbourhood (Zeitler & Buys, 2015).

## Theme 7: Outdoor Areas and Older People

The provision of, and access to greenspace and open space outdoors improves the quality of neighbourhoods. For older people, being able to visit nearby outdoor space can improve their well-being via the associated benefits of health and social connection.

Suburban living of low-to-mid density provides opportunity for neighbourhood design to incorporate multiple green and open spaces. For those living in neighbourhoods of higher density, there is less likely to be very good access to such spaces (Temelová & Dvořáková, 2012; Föbker & Grotz, 2006). Older people living in suburban areas have preference for smaller outdoor spaces that allow them to sit and enjoy their surroundings (Temelová & Dvořáková, 2012; Novek & Menec, 2014). This contrasts with the desires of younger generations who prefer bigger outdoor spaces. Older people studied by Baldwin et al. (2019) supported the notion of a town square, or similar open space design, that brings together a mix of generations. In order to meet the needs of residents of all ages, neighbourhoods would benefit in having a variety of spaces available for residential use (Alidoust et al., 2014; Burton & Mitchell, 2006).

An alternative approach to greenspace is the appearance of community gardens. Community gardens are beneficial to health with their encouragement of social interaction and development of sense of community and place (Abraham, Sommerhalder, & Abel, 2010; Blake & Cloutier-Fisher, 2009; Kweon et al., 1998). In addition, including a men's shed, providing 'facilities for retired men and people with a disability to learn new skills, share old trade skills and be part of a team that work together' extends the benefits of social interaction to those less likely to join in (Baldwin et al., 2019).

Utilisation of outdoor greenspaces and open spaces provides multiple health and well-being benefits for users. Visiting greenspaces benefits the health of elderly by encouraging active ageing through the provision of locations where residents can be physically active whilst also being locations for planned or spontaneous social interactions (Michael et al., 2006; Gong et al., 2014; Sugiyama & Ward Thompson, 2007; Alidoust et al., 2014; Takano, Nakamura, & Watanabe, 2002). Outdoor spaces offer pleasure to older people and improves their psychological health through access to nature, sunlight, and fresh air (Buckenberger, 2012; Sugiyama & Ward Thompson, 2007; Aspinall et al., 2010; De Donder et al., 2013; Takano et

al., 2002). Outdoor green spaces have also been shown to reduce both stress and anger of adults of all ages (Sugiyama & Ward Thompson, 2007; Carman, 2006). Access to outdoor spaces may increase the longevity of older people (Lestan et al., 2014; Lee & Maheswaran, 2010; Harris, 2013; Takano et al., 2002). When older people visit the greenspaces and open spaces in their neighbourhood, their 'smell, touch, taste, sight and sound' are all exposed to the elements of the natural environment surrounding them (Carman, 2006, p. 2).

Successful neighbourhood designs incorporate greenspaces and open spaces that are easily accessible for all residents. Access to greenspace is frequently identified as the main issue when residents of all ages are consulted about the design of their neighbourhood (Temelová & Dvořáková, 2012; Lestan et al., 2014). Older people and people with disabilities appreciate the provision of appropriate seating, shade and shelter, and accessible toilets (Baldwin et al., 2019). The latter is, no doubt, also appreciated by the parents of young children. If there are environmental barriers within neighbourhoods that make it difficult for older people to access the local outdoor spaces, the potential quality of life benefits that these spaces offer are lost (Ward Thompson, 2014; Sugiyama & Ward Thompson, 2007; Lestan et al., 2014). The provision of greenspaces is one of the key factors of age-friendly environments, their presence in neighbourhoods is essential (De Donder et al., 2013).

## Theme 8: International Initiatives Involving Older People in Neighbourhoods

The age-friendly approach, established by the WHO, recognised the importance of making places more suitable for supporting older people as they age (Ward Thompson, 2014; Mahmood & Keating, 2012). This approach asserts that changes made to improve functionality for older people, will also benefit all other users of the environment (Biggs & Carr, 2015). Western governments are incorporating this approach into many of their policies as they attempt to develop and reform all neighbourhoods as liveable neighbourhoods (Vine et al., 2012; Alidoust et al., 2014). Elements of this concept can be found in policies, plans, and documentation under similar terminology, e.g. healthy ageing perspective, and liveable neighbourhoods. In 2007 the WHO produced the *Global Age-friendly Cities Guide* which emphasises the importance of improving accessibility to amenities in neighbourhoods and improving the overall quality of built characteristics in neighbourhoods to better suit the needs of older people (Lager et al., 2016; Biggs & Carr, 2015). As well as the physical changes, the guide provides suggestions linked to social welfare provision (Lager et al., 2016). Mahmood & Keating (2012) also identify an additional bonus of decreasing levels of social exclusion that have occurred as a result of age-friendly designs.

Universal Design embraces the theory that environments improved for older people will also assist all other users (Biggs & Carr, 2015; Frye, 2014). As this approach portrays all the suitable characteristics needed for age-friendly environments, it is frequently incorporated into the

design of neighbourhoods for older people (Vine et al., 2012; Mahmood & Keating, 2012). Inclusive Design is an alternative approach used to design built environments that cater to all ages and abilities. Inclusive Design is utilised in the Streets for Life concept developed by Burton & Mitchell (2006) which aims to create streets throughout neighbourhoods that people of all ages feel safe and comfortable using (Burton & Mitchell, 2006). These initiatives are discussed in Part 3.

All of these initiatives can assist older people in being able to continue living independently in their neighbourhoods with easy access to all amenities (Lager et al., 2016; Biggs & Carr, 2015; Jackisch et al., 2015). These initiatives also highlights how strong an influence local environments have over the quality of life held by residents (Moore et al., 2011). Moving forward, these initiatives need to be incorporated into every element of development, refurbishment, and maintenance, In order to create the best environments for older people (Jackisch et al., 2015).

Policies to Support Older People in Neighbourhoods

Whilst New Zealand's response is slower than some other similar countries (partly due to a younger age profile), relatively recent policies support ageing in place (Ministry of Health, 2016). Through integration of ageing in place and age-friendly concepts in national and local plans and policies, neighbourhoods of greater quality can be created for the older people (Vine et al., 2012; Parra et al., 2010; Biggs & Carr, 2015; Alidoust et al., 2014; Burton & Mitchell, 2006). In order to successfully achieve this, Sugiyama & Ward Thompson (2007) stipulate the necessity to provide planners, policy makers, and any other parties involved in the design of neighbourhoods with all appropriate and vital information (Jackisch et al., 2015; Zeitler & Buys, 2015; Novek & Menec, 2014).

International research has identified the importance of incorporating the voice of older people into the development of policies and plans. Multiple sources talk of a lack of consultation with older people, or opportunity for them to participate in the relevant decision-making processes (Biggs & Carr, 2015; Mahmood & Keating, 2012; Strobl et al., 2016; Alidoust et al., 2014; Wiles, 2011; Office for Seniors, 2016; Davey, 2006; Wiles et al., 2011). Chan & Cao (2015) recognise the value of knowledge held by older people and the assistance this could provide when making changes to their living environments; and believe a shift in the role of older people from clients to change makers will increase the success of neighbourhood design outcomes. Frye (2014) drawing on a range of international case studies, argues that it is important to make changes as soon as possible in order to reduce the potential negative consequences that may occur.

The New Zealand Government has a specific Office and Minister for Seniors. The Office and the Minister for Seniors work with community groups, local and regional councils, and the

central government on issues relating to the older people of New Zealand (Office for Seniors, 2017). There are two policy statements in place that relate to the ageing population: the Positive Ageing Strategy 2001 which has a focus on social aspects of ageing, and the Healthy Ageing Strategy 2016 which centres on the health and well-being of older people. The Positive Ageing Strategy has a vision for 'a society where people can age positively, where older people are highly valued and where they are recognised as an integral part of families and communities' (Ministry of Social Policy, 2001, p. 13). This strategy has goals of supporting older people when they choose to independently age in place, and assist older people in the process of increasing their levels of participation in their neighbourhoods. The Healthy Ageing Strategy 2016 works towards ensuring that 'older people live well, age well, and have a respectful end of life in age-friendly communities' (Ministry of Health, 2016, p. ii). This strategy recommends a life-course approach to bettering the health and well-being of the older people of New Zealand (Ministry of Health, 2016b).

There is a need for local governments to create supporting documents that are specific to their local areas (Frye, 2014). However, as of 2016, only 35 percent of New Zealand councils have these plans, strategies, or policies in place for their older people (Office for Seniors, 2016). Wellington City Council has a Positive Ageing Policy (Wellington City Council, 2012). The policy states its connection to the national Positive Ageing Strategy, and stipulates that any future development of strategies, plans, and policies for the city will take into account the needs of the growing older age cohort (Wellington City Council, 2012). The Auckland Council has a Seniors Advisory Panel which provides advice to the council by identifying issues that are of concern to older people and provide assistance informed by their role as older people in society (Auckland Council, 2017). This panel fulfils the recommended consultation with and participation of older people, however, there is no age related strategy or plan in place for the Auckland region.

## Conclusion

Neighbourhoods are changing to meet the needs of the growing population of older people who want to age in place. Older people encounter many physical and cognitive changes as they age, leading to a reduction of the areas in which they spend the majority of their time in later life. With home and neighbourhood being the two main functional locations, it is important neighbourhoods are designed in order to encourage the continuation of both an active and independent lifestyle, thereby supporting both the well-being and quality of life for older residents. Recognising that neighbourhoods designed specifically for one age bracket can lead to negative outcomes for others has led to a focus on planning neighbourhoods which can be used by people of all ages and abilities.

There is complexity involved in both defining a neighbourhood and designing a neighbourhood. Both processes involve the recognition of the physical, policy, and social environments. The main consideration to be made when designing age-friendly environments for older people (mainly located in suburban areas), is the incorporation and provision of accessibility and ease of use. Designing a walkable neighbourhood with the inclusion of simplistic features, can contribute to producing more accessible and age-friendly environments. The physical, social, and recreational opportunities that greenspaces, open spaces and community spaces offer to older people make them a vital component of future neighbourhoods. Critical design features of age-friendly neighbourhoods include: design for safety; access (or close proximity) to facilities and services; well-maintained pavements, pedestrian crossings and community public spaces; suitable street layouts and traffic calming methods; mobility options (such as appropriate public transport); user friendly green spaces; thoughtful design of porches and front gardens enabling social exchange; and community opportunities for neighbourly relationships to develop and be sustained. In addition, involving older people in the planning and design processes can contribute to making ageing in place neighbourhoods more accessible and inclusive.

## Bibliography


Abraham, A., Sommerhalder, K., & Abel, T. Landscape and well-being: a scoping study on the health-promoting impact of outdoor environments. *International Journal of Public Health*, 55, 59-69.

Adams, A., & Chivers, S. (2016). There's No Place like Home: Designing for Long-Term Residential Care in Canada. *Journal of Canadian Studies*, 50(2), 273-298.

Alidoust, S., Holden, G., Bosman, C. (2014). Urban Environment and Social Health of the Elderly: A Critical Discussion on Physical, Social and Policy Environments. *Athens Journal of Health*, 1(3), 169-180.

Alidoust, S., Bosman, C., Holden, G., Shearer, H., & Shutter, L. (2017). The spatial dimensions of neighbourhood: how older people define it. *Journal of Urban Design*, 22(5), 547-567.

Annear, M., Cushman, G., & Gidlow, B. (2009). Leisure time physical activity differences among older adults from diverse socioeconomic neighborhoods. *Health & Place*, 15, 482-490.

Aspinall, P., Ward Thompson, C., Alves, S., Sugiyama, T., Brice, R., & Vickers, A. (2010). Preference and relative importance for environmental attributes of neighbourhood open space in older people. *Environment and Planning B: Planning and Desi*gn, 37, 1022-1039.

Baldwin, C. and Stafford, L. (2019). The Role of Social Infrastructure in Achieving Inclusive Liveable Communities: Voices from regional Australia. *Planning Practice and Research*, 34 (1) 18-46.

Barnett, A., Cerin, E., Ching, C., Johnston, J., & Lee, R. (2015). Neighbourhood environment, sitting time and motorised transport in older adults: a cross-sectional study in Hong Kong. *BMJ Open*, 5(4), 1-12.

Biggs, S., & Carr, A. (2015). Age- and Child-friendly Cities and the Promise of Intergenerational Space. *Journal of Social Work Practice,* 29(1), 99-112.

Blake, A., & Cloutier-Fisher, D. (2009). Backyard bounty: exploring the benefits and challenges of backyard garden sharing projects. *Local Environment,* 14(9), 797-807.

Buckenberger, C. (2012). Meanings of housing qualities in suburbia: empirical evidence from Auckland, New Zealand. *Journal of Housing and the Built Environment,* 27, 69-88.

Burton, E., & Mitchell, L. (2006). *Inclusive Urban Design: Streets for Life.* Burlington: Architectural Press.

Cao, X., Mokhtarian, P., & Handy, S. (2010). Neighbourhood Design and the Accessibility of the Elderly: An Empirical Analysis in Northern California. *International Journal of Sustainable Transportation,* 6(4), 347-371.

Carman, J. (2006). Re-creating 'the backyard' in senior communities. *The Journal on Active Aging*, January/February, 74-76.

Chan, A., & Cao, T. (2015). Age-Friendly Neighbourhoods as Civic Participation: Implementation of an Active Ageing Policy in Hong Kong. *Journal of Social Work Practice,* 29(1), 53-68.

Chippendale, T., & Boltz, M. (2015). The Neighbourhood Environment: Perceived Fall Risk, Resources, and Strategies for Fall Prevention. *The Gerontologist*, 55(4), 575-583.

Chui, E. (2001). Doomed Elderly People in a Booming City: Urban Redevelopment and Housing Problems of Elderly People in Hong Kong. *Housing, Theory and Society*, 18(3-4), 158-166.

Curtis, C., & Punter, J. (2004). Design-led sustainable development: The Liveable Neighbourhoods Experiment in Perth, Western Australia. *The Town Planning Review*, 75(1), 31-65.

Davey, J. (2006). "Ageing in Place": The Views of Older Homeowners on Maintenance, Renovation and Adaptation. *Social Policy Journal of New Zealand,* 27, 128-141.

Davey, J. A. (2007). Older People and Transport: Coping Without a Car, *Ageing and Society,* 27 (1), 49-65.

De Donder, L., Buffel, T., Dury, S., De Witte, N., & Verte, D. (2013). Perceptual quality of neighbourhood design and feelings of unsafety. *Ageing & Society,* 33, 917-937.

Dujardin, C., Lorant, V., & Thomas, I. (2014). Self-assessed health of elderly people in Brussels: Does the built environment matter? *Health & Place*, 27, 59-67.

Elsawahli, H., Shah Ali, A., Ahmad, F., & Al-Obaidi, K. (2017). Evaluating Potential Environmental Variables and Active Aging in Older Adults for Age-Friendly Neighborhoods in Malaysia. *Journal of Housing for the Elderly*, 31(1), 74-92.

Farrelly, L. (2014). Redefining, Reinventing and Realigning Design for Demographic Change. *Architectural Design*, 84(2), 8-13.

Föbker, S., & Grotz, R. (2006). Everyday Mobility of Elderly People in Different Urban Settings: The Example of the City of Bonn, Germany. *Urban Studies,* 43(1), 99-118.

Fokkema, T., Gierveld, J., & Nijkamp, P. (1996). Big Cities, Big Problems: Reason for the Elderly to Move? *Urban Studies*, 33(2), 353-377.

Frye, A. (2014) Growing Old in the City. *Journal of Urban Design*, 19(3), 269-274.

Fuzhong, L., Fisher, K., Brownson, R., & Bosworth, M. (2005). Multilevel modelling of built environment characteristics related to neighbourhood walking activity in older adults. *Journal of Epidemiol Community Health,* 59, 558-564.

Gong, Y., Gallacher, J., Palmer, S., & Fone, D. (2014). Neighbourhood green space, physical function and participation in physical activities among elderly men: the Caerphilly Prospective study. *International Journal of Behavioural Nutrition and Physical Activity*, 11(40).

Harris, K. (2013). *Age Friendly Societies in Our Time? A Literature Review*. Saint Paul: Wilder Research Centre.

Jackisch, J., Zamaro, G., Green, G., & Huber, M. (2015). Is a healthy city also an age-friendly city? *Health Promotion Internatio*nal, 30(S1), 108-117.

Kerr, J., Norman, G., Millstein, R., Adams, M., Morgan, C., Langer, R., & Allison, M. (2014). Nwighborhood Environment and Physical Activity Among Older Women: Findings From the San Diego Cohort of the Women's Health Initiative. *Journal of Physical Activity and Health*, 11, 1070-1077.

Kweon, B., Sullivan, W., Wiley, A. (1998). Green Common Spaces and the Social Integration of Inner-city Older Adults. *Environment and Behaviour*, 30(6), 832-858.

Lager, D., Van Hoven, B., & Huigen, P. (2016). Rhythms, ageing and neighbourhoods. *Environment and Planning A*, 48(8), 1565-1580.

Lawhon, L. (2003). Planners' Perceptions of their Role in Socially Responsive Neighbourhood Design. *Journal of Architectural and Planning Research,* 20(2), 153-163.

Lee, A., & Maheswaran, R. (2010). The health benefits of urban green spaces: a review of the evidence. *Journal of Public Health,* 33(2), 212-222.

Lehning, A. (2014). Local and Regional Governments and Age-Friendly Communities: A Case Study of the San Francisco Bay Area. *Journal of Aging & Social Policy,* 26(1-2), 102-116.

Lestan, K., Erzen, I., & Golobic, M. (2014). The Role of Open Space in Urban Neighbourhoods for Health-Related Lifestyle. *International Journal of Environmentsl Research and Public Health*, 11, 6547-6570.

Loo, B., Mahendran, R., Katagiri, K., & Lam, W. (2017). Walking, neighbourhood environment and quality of life among older people. *Current Opinion in Environmental Sustainability*, 25, 8-13.

Luz, T., Cesar, C., Lima-Costa, M., & Proietti, F. (2011). Satisfaction with the neighbourhood environment and health in older elderly: cross-sectional evidence from the Bambui cohort study of aging. *Cad. Saúde Pública,* 27(3). 390-398.

Mahmood, A., & Keating, N. (2012). Towards inclusive built environments for older adults. In Scharf, T., & Keating, N (Ed.), *From exclusion to inclusion in old age* (pp. 145-162). Bristol: Policy Press, University of Bristol.

Marquet, O., & Miralles-Guasch, C. (2015). Neighbourhood vitality and physical activity among the elderly: The role of walkable environments on active ageing in Barcelona, Spain. *Social Science & Medicine,* 135, 24-30.

Michael, Y., Green, M. & Farquhar, S. (2006). Neighborhood design and active aging. *Health & Place,* 12, 734-740.

Milton, S., Pliakas, T., Hawkesworth, S., Nanchahal, K., Grundy, C., Amuzu, A., Casa, J., & Lock, K. (2015). A qualitative geographical information systems approach to explore how older people over 70 years interact with and define their neighbourhood environment. *Health & Place,* 36, 127-133.

Ministry of Health (2002). *Health of Older People in New Zealand: A Statistical Reference.* Wellington: Ministry of Health.

Ministry of Health (2016). *Healthy Ageing Strategy*. Wellington: Ministry of Health.

Ministry of Health (2016b). *Healthy Ageing Strategy: a strategic framework.* Wellington: Ministry of Health.

Ministry of Social Policy (2000). *Factors Affecting the Ability of Older People to Live Independently.* Wellington: Ministry of Social Policy.

Ministry of Social Policy (2001). *The New Zealand Positive Ageing Strategy*. Wellington: Ministry of Social Policy.

Mitchell, L., Burton, E., Raman, S., Blackman, T., Jenks, M., & Williams, K. (2003). Making the outside world dementia-friendly: design issues and considerations. *Environment and Planning B: Planning and Design*, 30, 605-632.

Moore, K., Hill, K., Robinson, A., Haines, T., Haralambous, B., & Nitz, J. (2011). The state of physical environments in Australian residential aged care facilities. *Australian Health Review*, 35, 412-417.

Novek, S., & Menec, V. (2014). Older adults' perceptions of age-friendly communities in Canada: a photovoice study. *Ageing & Society,* 34, 1052-1072.

Nyunt, M., Shuvo, F., Eng, J., Yap, K., Scherer, S., Hee, L., Chan, S., & Ng, T. (2015). Objective and subjective measures of neighbourhood environment (NE): relationships with transportation physical activity among older persons. *International Journal of Behavioural Nutrition and Physical Activity*, 12(108).

Office for Seniors. (2016). *What an ageing population means for our regions.* Retrieved from http://www.superseniors.msd.govt.nz/documents/publications/office-for-seniors-110-osc115-fact-sheets-may-2016.pdf

Parra, D., Gomez, L., Sarmiento, O., Buchner, D., Brownson, R., Schimd, T., Gomez, V., & Lobelo, F. (2010). Perceived and objective neighbourhood environment attributes and health related quality of life among the elderly in Bogotá, Colombia. *Social Science & Medicine*, 70, 1070-1076.

Patterson, P., & Chapman, N. (2004). Urban Form and Older Residents' Service Use, Walking, Driving, Quality of Life, and Neighbourhood Satisfaction. *American Journal of Health Promotion,* 19(1), 45-52.

Ribeiro, A., Mitchell, R., Sá Carvalho, & de Fátima de Pina. (2013). Physical activity-friendly neighbourhood among older adults from a medium size urban setting in Southern Europe. *Preventive Medicine,* 57, 664-670.

Rogers, G., & Sukolratanametee, S. (2009). Neighborhood design and sense of community: Comparing suburban neighborhoods in Houston Texas. *Landscape and Urban Planning*, 92, 325-334.

Strobl, R., Maier, W., Ludyha, A., Mielck, A., & Grill, E. (2016). Relevance of community structures and neighbourhood characteristics for participation of older adults: a qualitative study. *Quality of Life Research,* 25, 143-152.

Sugiyama, T., & Ward Thompson, C. (2007). Outdoor environments, activity and the well-being of older people: conceptualising environmental support. *Environment and Planning A,* 39, 1943-1960.

Sugiyama, T., Caerin, E., Owen, N., Oyeyemi, A., Conway, T., Van Dyck, D., Schipperijn, J., Macfarlane, D., Salvo, D., Reis, R., Mitas, J., Sarmiento, O., Davey, R., Schofield, G., Orzanco-Garralda, R., & Sallis, J. Perceived neighbourhood environmental attributes associated with adults' recreational walking: IPEN Adult study in 12 countries. *Health & Place,* 28, 22-30.

Takano, T., Nakamura, K., Watanabe, M. (2002). Urban residential environments and senior citizens' longevity in megacity areas: the importance of walkable green spaces. *Journal of Epidemiol Community Health,* 56, 913-918.

Taylor, M., & Buys, L. (2014). Ageing Suburbia: Designing for Demographic Change in Australia and New Zealand. Archi*tectural Design,* 84(2), 54-59.

Temelová, J., & Dvořáková, N. (2012). Residential satisfaction of elderly in the city centre: The case of revitalizing neighbourhoods in Prague. *Cities,* 29, 310-317.

Van Der Greft, S., Musterd, S., & Thissen, F. (2016). Residential dynamics and neighbourhood conditions of older migrants and native Dutch older adults in Amsterdam, The Netherlands. *Ageing & Society,* 36, 189-218.

Van Dijk, H., Cramm, J., Van Exel, J., & Nieboer, A. (2015). The ideal neighbourhood for ageing in place as perceived by frail and non-frail community-dwelling older people. *Ageing & Society*, 35, 1771-1795.

Vine, D., Buys, L., & Aird, R. (2012). The use of amenities in high density neighbourhoods by older urban Australian residents. *Landscape and Urban Planning*, 107, 159-171.

Ward Thompson, C., Curl, A., Aspinall, P., Alves, S., & Zuin, A. (2014). Do changes to the local street environment alter behaviour and quality of life of older adults? The 'DIY Streets' intervention. *British Journal of Sports Medicine,* 48(13), 1059-1065.

Weiss, R., Maantay, J., Fahs, M. (2010). Promoting Active Urban Aging: A Measurement Approach to Neighbourhood Walkability for Older Adults. *Cities Environ.,* 3(1), 1-17.

Wellington City Council. (2012). Positive Ageing Policy. Wellington: Wellington City Council.

Wiles, J., Allen, R., Palmer, A., Hayman, K., Keeling, S., Kerse, N. (2009). Older people and their social spaces: A study of well-being and attachment to place in Aotearoa New Zealand. *Social Science & Medicine*, 68, 664-671.

Wiles, J. (2011). *Resilient Ageing in Place: Project Recommendations & Report.* Auckland: The University of Auckland.

Wiles, J., Leibing, A., Guberman, N., Reeve, J., & Allen, R. (2011). The Meaning of "Aging in Place" to Older People. *The Gerontologist,* 52(3), 357-366.

Wilkerson, A., Carlson, N., Yen, I., & Michael, Y. (2012). Neighborhood Physical Features and Relationships With Neighbors: Does Positive Physical Environment Increase Neighborliness? *Environment and Behaviour,* 44(5), 595-615.

Zegras, C., Lee, J., & Ben-Joseph, E. (2012). By Community or Design? Age-restricted Neighbourhoods, Physical Design and Baby Boomers' Local Travel Behaviour in Suburban Boston, US. *Urban Studies,* 49(10), 2169-2198.

Zeitler, E., & Buys, L. (2014). Mobility and out-of-home activities of older people living in suburban environments: 'Because I'm a driver, I don't have a problem'. *Ageing & Society,* 35, 785-808.

## Part 3: Are Suburban Neighbourhoods meeting the Needs of Disabled People?

### Introduction

This is a literature review of the policies and academic studies broadly relevant to disability in suburban environments. This work adopts the definition of disability used within the New Zealand Human Rights Act 1993 section 21(1)(h) which includes:

- physical disability or impairment (such as respiratory condition)
- physical illness
- psychiatric illness (such as depression or schizophrenia)
- intellectual or psychological disability or impairment (such as learning disorders)
- any other loss or abnormality of psychological, physiological or anatomical structure or function (such as arthritis or amputation)
- reliance on a guide dog, wheelchair or other remedial means
- the presence in the body of organisms capable of causing illness (such as HIV/AIDS or hepatitis).

According to Statistics New Zealand (2014), over 1 million people, or 24% of New Zealanders, were disabled in some way in 2013. This figure was higher than previous years, hypothesised to be due to the aging population. The most common disability, especially within the older adult group, is physical disability caused by illness or disease. The most common type of disability in children under 15 are learning disabilities. Hearing and visual impairments are also correlated with older age, and affect 11% of the population. Psychological and intellectual disability are least common, only affecting 5% and 2% of the population respectively. Finally, it is important to note that half of disabled people responding to the survey had more than one impairment, and the chances of this increases with age.

This review is interested in criticism from disability advocacy/theorists, lived experiences and opinions of disabled people, and operational/proposed design guidelines. Themes around this research largely relate to the positive impacts and utility from universal design, but also caution in using universal design uncritically. Ultimately, people with disabilities cover a large, non-homogenous group that is near impossible to objectively describe. There is even disagreement within disabled circles as to what constitutes disability, and what should be provided for, to assist those with disabilities. An accessible solution for one disabled person may be very different from another – even between those who may be considered to have the same impairment. Therefore, the only solution that appears relatively uncontested is the fundamental need to understand the community which needs to be accommodated, and work as collaboratively as possible during every step of the design process to ensure something suitable is created. Planning and designing future neighbourhoods, whilst recognising the

likely needs of the residents in say 50 years, requires flexibility and adaptability to be incorporated into the design.

A scan of the research literature identified a broad range from theoretical debates to interviewing disabled people on their experiences on the street and in their homes. Four main themes emerged: discussing the social oppression of the built environment; the activeness of disabled community members; the commonality of disability; and the cautions of using universal design.

## Theme 1: Social oppression of the built environment

Theories of disability emerged from disability civil rights discussions and protests, spearheaded by disability advocates. Scholars like Oliver (1996) and Imrie (1996) identified that previously, disability was originally seen as the fault of the person. The person's specific impairment was what disabled them, which made disability a 'personal tragedy'. The way to solve the issue was by treating the impairment or by using technological fixes. For this reason, this approach was labelled the 'personal tragedy' model, the 'individual' model, or the 'medical' model of disability (Oliver, 1996).

Oliver (1996) and others challenged this idea, stating "it is society which disabled physically impaired people" (p. 22). This argument stemmed the 'social model' of disability, which identified a 'design apartheid' and demanded society provide appropriate services for disabled people, instead of blaming them for their inability to navigate the built environment (Oliver, 1996; Imrie, 1996; Parr & Butler, 1999; Boys, 2014). In identifying the issue being a creation of the environment, and not a personal failing, these authors therefore identified disabled people as a uniquely oppressed group. This challenged the fields of urban planning and architecture, as implicit in creating this design apartheid. However, it is now acknowledged that these 2 disciplines can play a fundamental role in providing equality for people with disabilities.

Interest in accommodating for disabilities has increased since this conversation began. More effort has been taken in questioning the experiences of disabled people in order to understand the best way to implement a universally accessible environmental design (Storey, 2011; Manley, 2011). These requirements obviously differ from impairment to impairment, which face different challenges. Barriers within the physical environment are numerous and often pose vastly different issues. Therefore, this review has chosen to categorise barriers as those to physical access, wayfinding, information gathering, and safety.

Physical Access Barriers

Potentially the most classic understanding of disability access, this relates to a disabled person's ability to safely enter, travel through and exit a neighbourhood or location, and whether certain facilities or services can be comfortably reached or used. Badly designed or maintained structures are the main barriers faced. This issue affects much of the disabled population, especially those with mobility impairments or stamina issues.

Those with physical and visual impairments often identify partial or complete barriers such as uneven and broken surfaces, street obstacles, narrow ramps and doors, badly designed stairs or ramps (or the lack thereof), lack of handrails, or busy footpaths and roads (Central Council for the Disabled, 1969; Imrie & Kumar, 1998; Connolly, 2003; Burton & Mitchell, 2006; Kirchner, Gerber & Smith, 2008; Parkin & Smithies, 2012). Some design 'features' cause unintended consequences: tactile surface strips and cobblestones can create a slip or trip hazard, the latter causing physical pain and discomfort for the wheelchair user traversing them (Baldwin et al, 2019). Obstacles of particular issue were 'mobile' ones which could not be readily accounted for, such as parked cars on the footpath, or rubbish bins out for collection (Parkin & Smithies, 2012). Vegetation covering the footpath or overhanging branches was also frequently identified as an issue (Allen, Milner, & Price, 2002; Connolly, 2003; Manley, 2011). Many of these issues relate to maintenance more than design.

Those with a condition reducing stamina often need frequent public seating (Central Council for the Disabled, 1969; Connolly, 2003). One interviewee with a heart condition called public benches a 'god send', and said she would be unable to travel outside without them (Central Council for the Disabled, 1969, p. 10). It must be remembered that many people with heart conditions or other issues with stamina often cannot walk further than 100m or so without needing to rest, and so even moderate stretches without a rest spot can become a barrier (Central Council for the Disabled, 1969). Ramps were expressed as a particular problem area for many, particularly those with too steep a slope (Central Council for the Disabled, 1969; George, 2010; Manley, 2011). Some people with stamina impairments expressed a preference for stairs, as they were usually shorter (Central Council for the Disabled, 1969).

While public buildings like businesses and public facilities are required to be physically accessible in the United States, Thapar et al. (2004) found access unreliable for wheelchair users. Narrow entrances and hallways and stairs can render front-door access impossible. Sometimes, the 'solution' to this issue is to require the disabled person to enter via a back or side door, which can be humiliating (Imrie and Kumar, 1998). Features are regularly not designed for people at sitting height – desks, pay phones, signs and water fountains are usually located at standing height (Thapar et al., 2004). Other issues within public buildings include broken lifts, raised or lipped thresholds and poor surfacing (Thapar et al., 2004).

Homes were found to cause more issue for those with mobility impairment than visual impairment. Allen, Milner, and Price, (2002) found that because of their familiarity, several blind children had little issue with their home, and did not consider themselves impaired within it. This was also reflected upon their wider neighbourhood and school. Issues arose, however, with visiting the homes of friends and family, if housing layouts were very different. Adults with visual impairments expressed wants for more space in their homes; easier to reach controls; clear, unimpeded routes between doors; and better contrast (Royal National Institute for the Blind, 1995; Long, 1995; Allen, Milner, and Price, 2002). Both own homes and friend's homes posed significant issues for wheelchair users, whose basic needs often required wide spaces, ability to reach shelves, windows and appliances/power points, level surfaces within and between rooms, and no steps or raised thresholds (Beresford, and Oldman, 2002; Imrie, 2010). Inability to use one's home efficiently impeded independence and often affected quality of life – for example, some physically impaired people stated they lived off microwaveable meals due to being unable to use the kitchen (Imrie, 2010). Several participants in different studies identified the bathroom as a particularly problematic area. Since many bathrooms had no space to allow entry or manoeuvring of a wheelchair, some people found they had to use the toilet and wash themselves with the door open (Imrie, 2010). Others with late onset mobility impairment could not reach their bathroom, as it was on the second level of their house. They were forced to have sponge baths or bathe outside with a hose (Imrie, 2010).

Public transport was a challenge when buses had no low platforms to board, were uncomfortable, and were crowded. A New Zealand Human Rights Commission (2005) study found that many city buses simply could not accommodate mobility equipment, or allow those who could not step high up to board. Other bus drivers refused to service those with disabilities, driving past them and causing humiliation and frustration. While all Auckland city buses and trains now are designed to accommodate mobility equipment and the physically impaired, ensuring all bus drivers are well trained and accommodating may be more difficult to guarantee. This is exacerbated by the timetabling schedules that bus drivers operate under, which may give little time to provide additional assistance to passengers.

Playgrounds for disabled children have recently been a topic of examination, with several countries re-examining their playground standards (Yantzi, Young & Mckeever, 2010; Moore & Lynch, 2015; Stephens et al., 2015). However, an investigation into the state of Wellington City's neighbourhood playgrounds discovered extremely subpar performance (Perry et al., 2017). Most playgrounds in that city lacked a variety of equipment that was physically accessible for mobility impaired children or parents – for example, most raised equipment had no ramps, most swing sets were without a full-body support option, and most slides did not have room for two people to slide down side-by-side. Several playgrounds lacked hard surfaces to be accessed by a wheelchair. Most lacked accessible car parks, accessible toilets,

and low water fountains. Wellington City's playground design has been found to impede the ability of disabled children to play with their peers, which has proven benefits to development (Perry et al., 2017). Since there is no mandatory requirement on New Zealand local councils to ensure accessibility in playgrounds, it seems likely that these findings can be generalised to the playgrounds provided by other local councils.

Wayfinding/navigation barriers

If a person is unable to find their way around their neighbourhood, or to a specific location, even fully physically accessible neighbourhoods become unusable. This issue relates largely to the visually and cognitively impaired, who may need more environmental cues to understand where they are in relation to their environment. However, people from all disabilities have been found to struggle occasionally with wayfinding due to badly written or placed signs, unhelpful or ignorant pedestrians, or crowded and jostling streets (Thapar et al., 2004).

To understand barriers, it is best to understand how some disabled people navigate their environment, often to great success. It must be remembered that only very few visually impaired people see nothing at all, and so can usually at least make out contrasting colours and lights (Barker and Fraser, 2000). The visually impaired largely navigate with visual, auditory and tactile information, which come together to form habits within a familiar environment, which writes and informs an inner mental map (Allen, Milner & Price, 2002; Hersh, 2016). This mental map allows for confident navigation of familiar environments, and can be extrapolated to assist with navigation of more unfamiliar environments (Allen, Milner & Price, 2002). Information is obtained through the body and equipment, such as the long cane which is swept side to side to gather tactile information, or a guide dog to keep the person walking safely in a straight line (Schoon, 2010; Parkin and Smithies, 2012; Bates, 2015; Hersh, 2016). Kerbs and building lines are essential for people and dogs to understand the best line to walk (Schoon, 2010; Parkin and Smithies, 2012; Bates, 2015). Junctions are crucial information points, allowing the visually impaired pedestrian to understand where they are in the neighbourhood, often marked out by tactile pavement and a dropped kerb (Schoon, 2010; Bates, 2015).

Wayfinding barriers therefore largely came about from interference with one's mental map, such as 'modern', unintuitive designs). Shared surfaces are especially problematic. Often lacking a kerb or navigational reference, and street furniture often blocking a clear path along the building line, the visually impaired have expressed troubles in understanding where is safe to walk, and how to walk in a straight, safe line (Bates, 2008; Parkin & Smithies, 2012; Bates, 2015). These authors identify that even guide dogs cannot navigate shared surfaces, due to being trained to navigate by using the kerb line, with a minimum vertical kerb height of 60 mm. In addition, the lack of demarcation between the spaces used by cars and the pedestrian requires 'negotiation' between drivers and pedestrians, which is impossible for people with a

vision impairment. The resultant lack of orientation can result in a pedestrian inadvertently walking into a vehicle's path (Schoon, 2010).

Other issues are created by small-scale inconsistencies, which create large issues. Mobile objects, like parked cars and bins, were unable to be accounted for in a mental map (Butler & Bowlby, 1997; Allen, Milner & Price, 2002). Crossing buzzers in an unusual location can be very difficult to find, while incorrectly placed tactile pavements may ensure a visually impaired person never finds the right place to cross (Imrie & Kumar, 1998; Parkin & Smithies, 2002). Other visually impaired people, especially those with late-onset disability, have expressed confusion over what tactile pavement may signify. While it technically only signifies a road junction, many interpret tactile pavement to signify a safe area to cross (Parkin & Smithies, 2012). Concerningly, this is often not the case.

Wayfinding is also a significant issue for the cognitively impaired, especially those with dementia. An age-related illness, dementia affects the brain and decreases awareness and recognition, which increases disorientation and confusion (Cheston & Bender, 1999). Those with dementia are at risk of becoming lost, even within a familiar neighbourhood, as their condition deteriorates. While traditionally, dementia and other memory-related illnesses were treated by institutionalisation, there is increasing awareness of the importance of independence, including the ability to run errands or simply enjoy the outside world (Blackman et al., 2003; Burton & Mitchell, 2006). More studies have now investigated how those with dementia understand their environment and how to find their way around it, to better understand how to accommodate their needs. An interesting symptom of dementia, is denial of the seriousness of the problem, including the possibility of getting lost (Cheston & Bender, 1999; Burton & Mitchell, 2006). This raises a further issue, that those with dementia are less aware of the barriers they have, and therefore are less likely to address them.

Many people with dementia navigate in similar ways to those without any wayfinding impairments. Landmarks, in the form of prominent buildings or public art, inform the awareness of where one is in the neighbourhood, and therefore where one needs to go (Burton & Mitchell, 2006; Sheehan, Burton & Mitchell, 2006). Key navigational decisions are made at junctions, and are assisted by a clear road hierarchy – main roads versus side streets (Burton & Mitchell, 2006). Those with dementia express a preference for walking in stimulating environments, along roads that are short and gently winding to better engage their attention (Burton & Mitchell, 2006). Fatigue or boredom increased the chances of getting lost. Those with dementia were found to be more likely to get lost on the way back home than on the way to a destination, after most energy for the walk had already been expended (Burton & Mitchell, 2006; Sheehan, Burton & Mitchell, 2006). It is perhaps an unsurprising observation that sudden changes within a familiar environment also increases the chances of getting lost (Burton & Mitchell, 2006).

Information barriers

This may relate partially to wayfinding, but also relates to obtaining more general information relevant to a place or task (such as understanding rules to follow in a park, or differentiating a bench from public art). Largely, the issue relates to a person's ability to interpret given information, or ask necessary questions. Therefore, information most often poses a barrier to those with sensory, intellectual, communication and cognitive impairments.

Bad sign writing often provides the greatest barrier to information gathering, as all people tend to rely upon them. Signs may be poorly written, poorly placed, difficult to read, or fail to convey information in enough formats (Barker & Fraser, 2000; Human Rights Commission, 2005; Parkin & Smithies, 2012). Additional difficulty may emerge for visually impaired people who do not speak English as their first language, and therefore require additional concentration (Human Rights Commission, 2005). While symbols are generally considered a universal solution, they can occasionally be ambiguous or confusing, especially if relatively 'new'. A survey of several people with dementia found many participants struggled recognising symbols for 'Information', 'Phone Booth', and 'Bike Lane' (Burton & Mitchell, 2006). Signs without good Braille and embossed letters are inaccessible to the fully blind, while verbal announcements may be inaccessible to the hearing impaired (Human Rights Commission, 2005). Lacking a variety of formats leaves these groups ignorant to important environmental information.

Public transport is a realm where information is critical – people must know where to catch it, what route to take, how to pay and where to get off. Those with visual impairments have expressed difficulty in interpreting time boards and timetable information, and difficulty identifying their bus, especially when lighting was bad or when several buses turned up at once (Human Rights Commission, 2005). One hearing impaired interviewee has stated he often misses train announcements, and therefore relies on following crowds of people if the platform changes (Human Rights Commission, 2005). Other deaf people have expressed difficulties in communicating with bus drivers (Hersh, Ohene-Djan & Naqvi, 2010). The deafblind, therefore, have significant issues in gathering the correct information in taking public transport and usually rely entirely on drivers or assistants to help them identify the correct stop, usually using communication cards (Human Rights Commission, 2005; Hersh, 2016). However, some deafblind travellers have identified unhelpful drivers, or those who even dropped them off in the wrong location (Human Rights Commission, 2005; Hersh, 2016).

Modern design presents a unique issue to those with dementia. The replacement of many traditional designs, such as the classic red phone box in Britain for new, sleeker designs has prevented those with dementia from understanding where to access important services like public phones (Burton & Mitchell, 2006). Some people have admitted to not being able to

recognise a simple bench, or entrance to a building, due to ambiguities that make these features unrecognisable to them (Burton & Mitchell, 2006).

Safety barriers

Environments cannot be called accessible if they are unsafe to use. Many people with impairments face the same safety barriers, including busy traffic, physical obstacles, and badly designed or maintained routes. Roads are dangerous within any neighbourhood, but can provide an acute barrier to certain impairments which slow movement or reaction time, unless appropriate pedestrian crossing facilities are in place. It can take a mobility impaired or visually impaired person seconds longer to cross than a non-impaired person, while a car travelling at suburban speeds can cover 14m per second (Schoon, 2010). This, combined with a lesser ability to nimbly observe the streets while crossing, makes people with these impairments particularly vulnerable while crossing a road (Allen, Milner and Price, 2002; Schoon, 2010; Baldwin et al, 2019). A further issue is raised for the visual impaired – tactile pavement is not nuanced to be informative of the type of road, and is not used consistently (Imrie, 1996; Parkin & Smithies, 2012). For example, there is no tactile cue to indicate a centre refuge approaching. Therefore, on large unfamiliar roads, the visually impaired cannot know if the road can be crossed in two stages or all at once, and rely entirely on road slope and traffic noises to know whether the tactile pavement they find indicates a centre refuge, or the opposite kerb (Parkin & Smithies, 2012).

A group of increasing research interest is people with impaired hearing. Sound provides essential information to inform the safety of crossing roads, and details what occurs in the wider peripheral environment (Byrd, 2007; Hersh, Ohene-Djan & Naqvi, 2010; Caswell, Barton, & Harris, 2016). For this reason, the hearing impaired appreciate good sightlines at crossings and wide, open spaces so they can understand more of what is happening around them (Byrd, 2007; Hersh, Ohene-Djan & Naqvi, 2010, Caswell, Barton, & Harris, 2016). Sign language is also notable for being a fairly 'spherical' activity – requiring space around the speaker and within the group, so all can participate without contact (Byrd, 2007). Therefore, spaces designed for the hearing impaired must be wide and lacking in obstacles, so those engaged in a signed conversation can walk through an environment without the risk of tripping (Byrd, 2007; Caswell, Barton, & Harris, 2016).

Little research could be found on safety barriers designed for people with mental disabilities, but safety is clearly an issue for some. Children with autism or attention deficit disorders are likely to 'run' at some point (Office for the Deputy Prime Minister, 2003). It is therefore crucial for playgrounds to be fenced, so these children cannot run far from their parents attention or into a hazardous area, like a river or road (Office of the Deputy Prime Minister, 2003; Perry et al. 2017). However, a survey of Wellington playgrounds found no neighbourhood playgrounds were fenced with the standard 1.2m high fence (Perry et al. 2017). Safety is also a concern for

those with dementia, at risk of getting lost. However, there is little written on how to address the safety concern, instead the focuses on how to ensure disorientation does not occur in the first place.

## Theme 2: Disabled people are active members of their neighbourhoods, despite challenges

Despite the struggles that poor design can create, it is apparent from the literature that many disabled people highly value being active members and independent of their neighbourhoods. They are not passive victims of their impairment, as the medical model may have assumed.

Children and adolescents are found to be very resilient to design faults. Allen, Milner and Price (2002) admitted surprise to discover visually impaired children struggled to name any issues they experienced within the home, and were often the safest members in the household from environmental issues like stairs or badly lit outdoor paths. While some parents were comfortable to let their visually impaired children catch public transport into the city by themselves, others were more restrictive. Some visually impaired adolescents Allen, Milner and Price (2002) interviewed highly craved freedom to roam their neighbourhoods after restricted childhoods, and expressed appreciation for some of the difficulties faced in doing so. These challenges created better wayfinding techniques, which better fostered independence. Indeed, Long (1995) stressed the importance of environments which encouraged movement and interaction, for better improving several skills among children and adolescents. However, Allen, Milner and Price (2002) found that children's play ranges are decreasing, forcing many to stay at home. Furthermore, busy roads that encouraged speeding also made parents warier of their child's safety outdoors. For example, McKeever et al. (2015) found only 4% of motor impaired children in Canada walked to school.

People with impairments and older people need to go outside to work and volunteer, see friends, run errands, and enjoy leisure, like everyone does (Central Council for the Disabled, 1969; Human Rights Commission, 2005; Clarke, Ailshire, Nieuwenhuijsen & de Klein – de Vrankrijker, 2011). However, several studies have found disabled people to be less physically and socially active than non-impaired people (Kirchner, Gerber & Smith, 2008; Clarke, Ailshire, Nieuwenhuijsen, & de Klein – de Vrankrijker, 2011; Boticello, Rohrbach & Cobbold, 2014). It is not a lack of willpower or need to be active that stops disabled people from being active, but prohibitions from the environment (Imrie & Kumar, 1998; Human Rights Commission, 2005; Clarke, Ailshire, Nieuwenhuijsen & de Klein – de Vrankrijker, 2011). Stemming from all this is a general frustration of feeling ignored by planners and designers, relegating disabled people to passive users of their environments and not active influencers. Disabled people are chronically underrepresented in consultation sessions, especially those with cognitive impairments like dementia or older disabled people (Blackman et al., 2003; Connolly, 2003).

This was confirmed even in simple processes: the frustration of disabled people has been expressed at local bodies for failing to take their concerns seriously, or taking far too long to address simple concerns like repairing pavement or clearing an overgrown hedge (Connolly, 2003). These attempts to be involved show disabled people are not passive victims and often take steps to create meaningful change within their own and other's views (Butler and Bowlby, 1997).

## Theme 3: Commonality of disability – need for universal design

Critics of the social model of disability were concerned with its simplicity. French (1991) identified its key issues, as a visually impaired scholar. While she was supportive of the general idea forwarded by the social model, she argued that some issues of disability stemmed solely from the impairment, and therefore could not be solved through the environment. In French's experience, this was her inability to recognise people visually, creating gradual isolation within her neighbourhood. This criticism has been substantiated by other scholars like Hall (1999), who argues the personal experiences of the disabled should not be downplayed. A key experience of the disabled as they navigate society is the personal impacts of access restriction, of illness and fear, rather than simple practical considerations of bad design.

This criticism has led to the emergence of the 'affirmation model' of disability – recognition that impairment is a normal part of life, which we therefore need to better engage with (Boys, 2014). This model is effective for recognising that accessible solutions are necessary not only for the disabled community, but also many people outside of it. Over the course of life, any ordinary person may require accessible design – as a child with lesser strength, stature and stamina, after an injury or disease impairing part of the body temporarily, and navigating with a pram or when pushing a wheelchair (Story, 2011). It is also important to remember that bodily functions often break down with age, and so most people will become impaired in some way as they grow older (World Health Organisation, 2011). The need for accessibility therefore is not required solely by a singular group of isolated individuals, but potentially by everybody from all ages and walks of life.

Universal design was inspired by civil rights movements, and the growing needs of aging populations across the world. While its principles began developing from the 1950s, the term was coined in 1985 in the United States, and 1997 the seven international principles were written by the Center for Universal Design (Ostroff, 2001). According to Story (2001), these principles are:

- *Equitable Use*. Ensures design is accessible for all users to avoid stigmatisation and segregation.
- *Flexibility in Use*. Provides choice in methods of use to accommodate all abilities.

- *Simple and Intuitive Use*. Design meets user expectations and intuition by removing complexity and adding consistency.
- *Perceptible Information*. Users can obtain all necessary information, regardless of their abilities.
- *Tolerance for Error*. Minimises potential hazards from unconscious or mistaken actions.
- *Low Physical Effort*. Allows users to comfortably and efficiently use the design with minimum fatigue.
- *Size and Space for Approach and Use*. Accommodates all body shapes, postures and ability as they approach, reach, manipulate and use the environment.

It has been argued by many scholars that following these principles will allow the environment to not only better accommodate the impaired (which every person is likely to be at least in some stage of life, permanently or temporarily), but everyone. If a design can be used by the most vulnerable users, then obviously this provides no hindrance to the least vulnerable, and may even create improvements in areas such as safety and efficiency.

## Theme 4: Cautions using universal design and generalisations

Boys (2014) is a disability scholar critical of the social model of disability and universal design due to the lacklustre results achieved in reality. To Boys (2014) and Chandler (2011), disability access remains an awkward additional consideration of architects (and planners) instead of being integrated within the design process. Accessibility and universal design uses language that frames disability as a homogenous issue, able to be solved with a coherent singular solution. This ignores that even straightforward problems may not easily be solved across every person's experience, and that certain solutions for one impairment may become a barrier for another (Boys, 2014; French, 1991). For example, a relatively homogeneous environment allows effective navigation of visually impaired person in a new part of town, but builds wayfinding barriers for a person with dementia. A shared surface lacking kerbs might be fully accessible to a wheelchair user, but cannot be used safely by the blind. Therefore, as universal design becomes more standardised, there is a chance it could place more barriers for other disabilities. This is especially concerning if it is only designed around one understanding of what disability is.

Several scholars have noted the focus of design rules and standards on the wheelchair (Thapar et al., 2004). There appears to be an assumption that designing for wheelchairs will create access for all, or perhaps even that only in people with wheelchairs have access issues. Even for designing for wheelchair use, this is somewhat simplistic, given the range of types of wheelchair available, and the possibility that a person may also use a walking frame or sticks for short periods. However, universal design can create more accessible areas for disabled people, and those in wheelchairs often need the most help. A study into public building access

for visual impairment, mobility impairment and wheelchair use by Thapar et al. (2004) hypothesised the wheelchair user would have greater access than the other disabled participants because of the nature of universal design standards. Instead, they found that the visually and mobility impaired participants had very good access, while the wheelchair user had the most difficulties, especially when entering public buildings. Other issues included unreachable public phones and desks, narrow doors and hallways, heavy doors and non-functioning elevators.

Viewing people in wheelchairs, or with a visually obvious impairment, as the only people in need of universal design is dangerous for people with less visually obvious impairments. Generalisations of disability has created a societal view of what disability should look like, and therefore those who do not match this appearance may face discrimination or complacency from others. French (1991), as a visually impaired scholar, found a neighbour who was unwilling to help her with any issues as she navigated her neighbourhood because he thought she walked too confidently to be 'truly' visually impaired. Bates (2015), as an engineer who became blind at a later age, argues that the engineering profession has not taken blind needs seriously in the past because of a similar assumption – the confidence in which many visually impaired people can navigate their environments means they are not 'truly' disabled, and therefore need no accommodations. This ignores the many complex navigational and wayfinding techniques adopted by the visually impaired, which requires several environmental features such as building frontage, kerbs, tactile and auditory information and clear pathways. The complacency or disbelief with which disability has been treated by workers of public buildings or services, and the general community at large, seems to be one of the key issues several disabled people have had to face, which is an issue that is less able to be fixed by the built environment (French, 1991; The Human Rights Commission, 2005).

Accessible design, no matter what form it comes in, is a difficult field. The act of living and navigating within a neighbourhood requires considerations at the micro- and macro- levels, and attention must be given to detail. Even within the most accessible neighbourhoods, use by some disabled people may be impossible or untenable if single features are inconsiderately designed. Accessible routes to a location, through entrances and exits, to essential features like toilets and site-specific services like reception desks and shelves, should be totally accessible for a place to be a worthwhile destination. However, these basic needs are often not met through compulsory design standards, and therefore often fail to be implemented.

## Theme 5: Importance of small-scale design

Designing for accessibility must be very detail oriented, for it is small details that may facilitate or impede a person's ability to use and move around in their neighbourhoods. Universal design frequently discusses the 'accessible journey', which is a linear set of tasks which must

be completed in order to get from origin to destination (Human Rights Commision, 2005). If any step of this journey is inaccessible, the entire journey becomes impossible to complete for the traveller, even if the rest of it is perfectly designed. Therefore, design guidance is often very specific to ensure every potential feature across an accessible journey is a facilitator of that journey, and not a barrier.

The home

The home is relatively small-scale in design, yet is also a significant space for all the time spent in it. Detail is therefore essential to ensure homes are tenable to live in. Lifemark (2017) is a New Zealand voluntary initiative which works with building agencies to create better accessible housing for occupants and visitors, suitable for all stages of life – from young childhood to retirement. Their guidelines (Lifemark, 2017) include:

- The pathway approaching any entrance to the home is safe and easy to use at all times.
- Outdoor and indoor surfaces are slip resistant and entry paths are covered and level.
- Ease of movement around one's parked car, in the kitchen, bathrooms and laundry, and around beds.
- Wide hallways, stairs and external/internal doors to accommodate mobility equipment.
- A bathroom containing a toilet and level entry shower is found on the ground floor and can be used independently by all occupants and visitors.
- Every bedroom has easy access to a bathroom. At least one bedroom is located on the ground level.
- Storage is usable and easy to access – drawers are easier to use than cupboards.
- Light switches and power outlets are located away from corners and at accessible and consistent heights.
- Door handles and taps are easy to use and at level heights. Levers easier than knobs.
- Windows have lever handles, and provide easy viewing.

These guidelines largely relate to those with mobility impairments, but Brawley (1992) developed guidelines specifically for those with dementia. Colour, contrast and light are important considerations for those with dementia, so environments remain clear and easy to recognise. Light must be balanced between natural and artificial to reduce glare and shadows. Contrast is important for clear recognition of objects or dangerous edges. Noisy backgrounds are more irritating and can cause agitation. Therefore, good insulation and acoustics is very helpful (Brawley, 1992). It is worth noting other authors agree with these guidelines for designing for the visually impaired (Long, 1995; Allen, Milner & Price, 2002). Finally, providing outdoor landmarks for a cognitively impaired person to recognise from the street, such as trees or hanging baskets distinct from the rest of the neighbourhood, can allow them to recognise when they are home (Brawley, 1992).

Experimental design at the Gallaudet University in Washington for Deaf students, could also be applied as guidelines in private dwellings, as explained by Byrd (2007) and Caswell, Barton and Harris (2016). Because of their reliance on sight, the hearing impaired prefer wide, open and permeable spaces. Closures within a space should only be implied, such as through opaque glass or half-walls. Terraced designs provide the best visual overview of a space. Wide, uncluttered spaces are very important to facilitate signed conversation – in groups this can take up a lot of space. Contrast is also important to ensure clarity of meaning while signing – pale blues and greens provides good contrast against skin tones. Finally, reflective surfaces are generally appreciated so the person can catch constant glimpses about what is happening outside of their peripheral vision.

The street

Moving into street design, details still remain important for many groups of people. The footpath is the key enabler for people with impairments, older people and children. Absent or poorly maintained footpaths; cars parked on and rubbish bins left blocking the footpath; drivers reversing from driveways without paying attention; and a lack of pedestrian crossings and kerb ramps were all identified as significant barriers for children with a diversity of mobility impairments (Stafford et al., 2019). In addition the lack of a separate footpath intensified fears of safety for parents and children, as children have to 'occupy the same space as (moving) vehicles' (Stafford et al., 2019).

Burton and Mitchell (2006) focussed on designing for dementia and the needs of older people in their work, but in doing so acknowledged the extension of application to disabled access more generally. Their guidelines address many concerns raised by large populations of people with impairments, as explored in Theme 1. In order of importance, Burton and Mitchell (2006) recommend:

- Better maintained, wide, smooth and non-slip pavements, clear from mobile objects like cars, bins or cyclists.
- More safe, recognisable crossings with audible and visual cues
- Clearer signs for all to read, only used when necessary. Text in preference over symbols.
- More wooden seating, with backs and arm rests
- Enclosed bus shelters with seating (see above point) to provide weather protection
- Level changes clearly marked and have handrails
- More accessible toilets
- Traffic calming measures, and/or buffer between road and footpath on busy streets
- Junctions have distinctive features to assist recognising one's location within the neighbourhood

- Buildings have obvious entrances and their design clearly reflect their use
- Streets are not too long and wind gently to better engage attention of user

The emphasis on familiarity and comfort recognises the specific needs of those with dementia, while also providing solutions beneficial to other impairments, such as mobility and visual. However, more detail is important to ensure full accommodation of these needs. Schoon (2010) outlined some key guidelines to create safer crossings for these groups:

- Narrow lanes to reduce exposure to cars
- Clear, extended sightlines available from kerb
- If possible, provide a shoulder or safe zone on the road before the dropped kerb, especially if there is a lip or steep slope that may slow down crossing over the kerb
- Tactile, auditory, and contrast cues used to signify crossings and safe moments to cross
- Keep kerb in place and only drop for crossing to assist with navigation of the visually impaired

Bates (2015) largely appears supportive of similar guidelines, and also stresses the importance of the kerb. He recommends they be used in shared streets, with a sufficient height to ensure the drivers of cars recognise them as such. He also recommends more traffic signals and pedestrian crossings at junctions, which may reduce the need to place crossings elsewhere. Finally, he recommends that bollards be at least one metre in height with no sharp edges, for anything below the knee creates a tripping hazard.

<u>The playgrounds</u>

A particular area where good micro-design is essential is accessible playgrounds. With smaller bodies and a potentially wide array of ways to be precluded from accessing play experiences, playground designers must be detail-oriented. The United Kingdom's Office of the Deputy Prime Minister (2003) has especially investigated the area, and concluded the aim should not be designing equipment for every child to use, but designing a total playground that any child could use with their peers. Therefore, focus should be on ensuring a variety of different play experiences, so children excluded from one piece of equipment or play area are not necessarily excluded from a similar experience elsewhere. The ODPM recommends:

- General, not specialised design. The more ways equipment can be used, the more children can use it.
- Do not overthink equipment for disabled children. For example, simply enlarging and modifying toddler equipment is often effective.
- Some areas would require smooth surfaces for wheelchair access to the facility. Other children, such as those with sensory impairments, prefer soft surfaces like bark or sand. Design around these different needs, preferably in consultation with the community.

- Think outward to designing play experiences in areas like public gardens. Water jets, for example, provides a fun experience almost every child can enjoy.
- Place seating nearby or within play facilities, so parents can inconspicuously sit near and assist their child if needed, or for children to sit and watch while still feeling included.
- Enhance play-space with natural features to allow more creative play.
- Ensure quiet spaces exist nearby for destressing or quiet play.
- Design as much space around equipment as possible for mobility.
- Provide ramps up to raised equipment and grab bars for the mobility impaired to move around with.
- Adolescents with intellectual impairments often enjoy children's play equipment also, but find themselves too big. Ground level trampolines have been expressed as a great tool for all ages.
- Fences prevent running away, and a new surface to play games with.
- Ensure storage for mobility equipment, accessible car parks and accessible toilets are nearby.
- Use tactile signs to give information, which can provide a new game for those with visual impairments.

In addition, parents or caregivers may have a disability, so appropriate seating, shelter from the rain and shade form the sun, and access to toilets should be available (Baldwin et al., 2019)

Signage

Finally, another important neighbourhood detail is good sign writing to break down informational and wayfinding barriers. According to Barker and Fraser (2000) of the Sign Design Society, there are four principles to good sign writing:

- Signs should be used only when necessary
- Sign location should be part of the process of building
- Messages should be short, simple and easily understood
- Signs should be consistent, using prescribed typefaces, colours and contrast.

## Theme 6: Importance of large-scale design

Macro neighbourhood features, like entire streetscapes and parks, are also crucial to consider in considering accessibility. Even if every detail of a route ensures accessibility, the travel is not worth conducting if the destination is too far away. A poorly designed neighbourhood context is untenable to live in for people with disabilities. Burton and Mitchel (2006) also considered macro-design considerations in writing guidelines for designing liveable streets for people with dementia, and a wider range of disabilities:

- Neighbourhood has mixed uses, plenty of services/facilities and open space

- Frequent small blocks laid in an irregular grid with minimal crossroads
- Varied urban form and architecture
- A clear hierarchy of streets – main streets, side streets, and laneways.

According to Burton and Mitchel (2006), designers should ensure most people live within 500m of primary facilities (like public transport, post office and bank, food shop, and health centre). They should also be within 800m of secondary facilities (like a place of worship, leisure, community facilities and open space), along with other primary facilities for redundancy. They should be within 125m of a phone and post box. This may seem extreme, but allowing disabled people to run their own errands and walk around their neighbourhood is important for dignity and independence. This extends not only to older adults, but adults, adolescents and children with disabilities also who need to work, see friends and family, and go to school and extracurricular activities.

## Theme 7: Importance of consultation

Because the needs of different impaired groups are so vast, even across those with the same impairment, a common theme emerging from the literature is designing environments with help from those people who use them. This will ensure that environments remain well suited to the actual people in the community, while also giving a sense of agency and influence to one of the more vulnerable groups of society.

This factor should also extend not only to new designs, but existing neighbourhoods. Maintenance issues are a key cause of physical barriers, such as broken pavements and overhanging vegetation. The users of an environment are the first to learn of these problems, and therefore listening to them will allow a local government to be ultra-responsive to any issues which may impede access or threaten safety. Guidelines not only discuss what needs to be designed to create a liveable neighbourhood, but stress the importance of an open-line to the public so the neighbourhood can remain liveable over the long-term (Connolly, 2003).

## Theme 8: Importance of mandatory, consistent disability policy

It is clear that most researchers, disability advocates and organisations, and disabled people, believe in the importance of clear and mandatory design guidelines to create better neighbourhood accessibility. These rules additionally would create the positive of having consistent design, which as has been previously discovered, is important to raising confidence navigating in the environment, as well as providing a facilitator for some disabilities.

Notwithstanding the requirements of the Building Code for new buildings, New Zealand's accessibility standards appear to be largely aspirational or provide only voluntary guidance. Disability issues are largely handled by the Office of Disability Issues, overseen by the Minister

of Disability Issues. The New Zealand Disability Strategy 2016-2026 was released under this agency, and makes access to community facilities, housing and streets, a key outcome. It is implemented through the Disability Action Plan 2014-2018, written with input from disabled people and advocacy agencies. This includes having good access to information in an understandable format. The Strategy considers the main facilitators for achieving this goal includes community consultation, implementing universal design, and educating professionals in accessibility principles. While this is the key document in achieving equitable outcomes for people with disabilities, it is entirely aspirational. Little could be found about monitoring the achievements or setbacks in implementing this (or the earlier) Strategy or Action Plan, which suggests that more could be done to consider the effectiveness of its goals, or the extent of implementation. An 'Outcome Framework' to monitor implementation of the strategy is currently under development (ODI, 2019)

The Auckland Design Manual also has aspirations towards universal design, though does not contain the same principles as the international standard. Instead, practically all of the international standards are combined into five broader principles: 'Body fit', 'Comfort', 'Awareness', 'Understanding', and 'Wellness'. The three other principles, 'Social integration', 'Personalisation' and 'Cultural Appropriateness' are more social and cultural matters not strictly relating to physical disability access. These broader principles do largely capture international standards but without the specificity. The Design Manual is also not a statutory document (providing only guidance) and can only be considered by council as a relevant 'other matter' under the section 104 of the Resource Management Act 1991.

The Auckland Unitary Plan, which is a statutory document, fails to address design principles. While it does have rules on outdoor lighting and signs, these largely relate to decreasing light pollution and billboards respectively. Interestingly, local government obligations towards accommodating disabled people within the public realm is fairly unaddressed in statute. Disability was only mentioned once in the 1974 Local Government Act, and discussed ensuring road crossing between kerbs were suitable for the disabled. The 2002 Act, which repealed the 1974 Act, does not include a similar provision, and does not mention disability in its provisions at all. Guidance for the public realm of streets and footpaths, is provided by the NZTA in its Pedestrian Planning and Design Guide (2007). And, in the case of Auckland, Auckland Transport's Code of Practice (2013) provides detailed requirements for the construction of new footpaths and pedestrian facilities, including pedestrians with disabilities, but this only addresses new construction.

The only mandatory standards come from the Building Act 2004, and only for 'reasonable and adequate access' to publicly accessibly buildings. For the most part, private dwellings (such as 1, 2 or 3 storey houses) face no accessibility requirements. The Building Standards and / or New Zealand Standard 4121 - an 'Alternative Solution' - can be used towards satisfying

building consent requirements. The general standard on public building accessibility, largely contains the broad design suggestions brought up by different groups internationally. The standard is primarily based around having an accessible route up to and through the main entrance and around the building; the provision of adequate and accessible toilet facilities, and car parking spaces for people with disabilities. This accessible route is to be free of clutter and assisted by facilitators like wide walkways or stairs/ramps, handrails, good surfacing, good lighting/contrast, and consistent signage.

In summary

The relatively minimal mandatory provisions for access for people with disabilities in New Zealand can be seen in the resultant built environment. Reliance on mandatory accessibility provisions for some new buildings assumes that the need for accessibility stops at the boundary of the development site; ignores the lack of accessibility requirements on most other new buildings in a suburban; and ignores the bulk of the built environment, streets and footpaths that were built before the current standards, guidelines and mandated requirements were put in place. Guidelines and other voluntary measures can achieve some level of improvement. However, without mandatory rules, inconsistent design or ignorance of the issues within neighbourhoods can occur, which risks the creation of inaccessible links within the average pedestrian journey. It has been noted by advocates and disabled people alike that without these rules, the issues they face are often treated as a second thought (Bristo, 1995; 90 Seconds New Zealand, 2016). This may be because these obligations are, literally, voluntary to solve. Therefore, while freedom of movement and non-discrimination are rights just as validly held by disabled people as others, they are routinely breached by authorities and building owners.

Further research is needed

This review of the research literature has made it clear that some impairments have been far better explored than others. While mobility, sensory and, to a degree, cognitive impairments are fairly well covered, much less has been considered by those with intellectual, learning or psychological impairments. It is unclear why this is – potentially because these impairments are less readily recognised as disability (especially historically), or an assumption that they do not face barriers from the environment. It would be highly worthwhile understanding how the environment may better or worsen these impairments, and what poses as barriers or facilitators in allowing these groups to comfortably use their homes and neighbourhoods. In addition, while this was a review on suburban neighbourhoods more generally, it relied a lot on extrapolating information from broader resources, or studies based on cities. It appears New Zealand has conducted little research on the experiences of disabled people in traditionally suburban environments.

## Conclusion

A key idea that has emerged out of disability theory, and therefore consideration of urban planning and architecture, is the oppression that is created by a poorly designed environment, be it from physical access barriers, wayfinding / navigation barriers, information barriers, and/or safety barriers. Thought into designing for different bodies and needs has not occurred seriously until recent decades, and because of the longevity of the built environment, disabling environments still remain a problem to be addressed.

Disability in suburbia is a complex topic, due to covering a wide array of different impairments and environments, including open space, streets, houses and public buildings. This has been a wide overview of the relevant literature and the themes which emerge from it. Improved design can be at the small-scale (recognising that one inaccessible component nullifies and accessible journey) and at the larger scale, such as across a neighbourhood. Design initiatives, such as universal design and inclusive design, offer the possibility of improved outcomes, whilst recognising the need to negotiate different and conflicting needs. The solution to this largely appears to be better community consultation (and disabled people are experts in their own needs), and the potential to design in the possibilities for adaption in the future.

Good design for people with disabilities may be a difficult and slow process, especially in old neighbourhoods where solutions must be retrofitted. The factor that makes the largest impact, however, is the will of the designers to work with the community to create a product suitable for all. As has been found, disabled people are not passive victims of their environments but enjoy being changing forces within their communities. Listening to them will overall be beneficial for everyone.

## Bibliography


90 Seconds New Zealand. (2016.) *What is Universal Design?* Auckland Council. Retrieved from https://www.youtube.com/watch?v=XbCeOpK7aWw

Allen, C., Milner, J. & Price, D. (2002). *Home is where the start is: The housing and urban experiences of visually impaired children.* The Policy Press: Bristol.

Auckland Council. *Auckland Council Disability Advisory Panel*. (2017). Auckland

Auckland Council. *Auckland Design Manual.* (2017). Auckland

Baldwin, C. and Stafford, L. (2019). The Role of Social Infrastructure in Achieving Inclusive Liveable Communities: Voices from regional Australia. *Planning Practice and Research,* 34 (1) 18-46.

Barker, P. & Fraser, J. (2000). *Sign Design Guide.* London, United Kingdom: JMU and the Sign Design Society.

Bates, D.M. (2008). User perspective: Blind people and shared surface developments. *Urban design and planning* DP2: 49-50.

Bates, D.M. (2015). Briefing: Retaining blind access in town streets and shared spaces. *Urban Design and Planning* 169(DP3): 123-128.

Be. Accessible. (2015). *Accessible Auckland.*
Retrieved from https://www.youtube.com/watch?v=HsC2NCA4yig.

Beresford, B. & Oldman, C. (2002). *Housing matters: National evidence relating to disabled children and their housing.* The Policy Press: Bristol.

Blackman, T., Mitchel, L., Burton, E., Jenks, M., Parsons, M., Raman, S. & Williams, K. (2003). The Accessibility of Public Spaces for People with Dementia: A new priority for the 'open city'. *Disability & Society,* 18(3): 357-371.

Botticello, A.L., Rohrbach, T. & Cobbold, N. (2014). Disability and the built environment: an investigation of community and neighbourhood land uses and participation for physically impaired adults. *Annals of Epidemiology* 24: 545-550.

Boydell, K.M., Gladstone, B.M., Crawford, E. & Trainor, J. (1999). Making do on the outside: everyday life in the neighbourhoods of people with psychiatric disabilities. *Psychiatric Rehabilitation Journal* 23(1):11-18.

Boys, J. (2014). *Doing Disability Differently.* New York, United States: Routledge.

Brawley, E. (1992). Alzheimer's disease: designing the physical environment. *The American Journal of Alzheimer's Care and Related Disorders & Research* January/February: 3-8.

Bristo, M. (1995). Lessons from the Americans with Disabilities Act. In G. Zarb (Ed.), *Removing Disabling Barriers.* London, United Kingdom: Policy Studies Institute.

Building Act, No. 72. (2004).
Retrieved from http://legislation.govt.nz/act/public/2004/0072/latest/DLM306036.html

Bundy, A.C., Wyver, S., Beetham, K.S., Ragen, J., Naughton, G., Tranter, P., Normal, R., Villeneuve, M., Spencer, G., Honey, A., Simpson, J., Baur, L. & Sterman, J. (2015). The Sydney playground project – levelling the playing field: a cluster trial of a primary school-based intervention aiming to promote manageable risk-taking in children with disability. *BMC Public Health* 15: 1125.

Burton, E. & Mitchell, L. (2006). *Inclusive Urban Design: Streets for Life.* Oxford: United Kingdom: Elsevier.

Butler, R. & Bowlby, S. (1997). Bodies and spaces: an exploration of disabled people's experiences of public space. *D: Society and Space* 15: 411-433

Byrd, T. (2007). Deaf Space. In J. Boys (Ed.), (2017), *Disability, Space, Architecture: A Reader* (pp. 241-246). New York: Routledge.

Caswell, E., Barton, G. & Harris, J. (2016). *How architecture changes for the Deaf.*
Retrieved from https://www.youtube.com/watch?v=FNGp1aviGvE

Central Council for the Disabled. (1969). *Planning for disabled people in the urban environment.* London, United Kingdom.

Cheston, R. & Bender, M. (1999). *Understanding Dementia: The Man with the Worried Eyes.* London, United Kingdom: Jessica Kinglsey Publishers.

Clarke, P.J., Ailshire, J.A., Nieuwenhuijsen, E.R. & de Klein – de Vrankrijker, M.W. (2011). Participation among adults with disability: The role of the urban environment. *Social Science & Medicine* 72: 1674-1684.

Connolly, P. (2003). *Liveable London: The need for a walkable neighbourhood.* London, United Kingdom: Living Streets.

Doherty, S.T., McKeever, P., Aslam, H., Stephens, L. & Yantzi, N. (2014). Use of GPS Tracking to Interactively Explore Disabled Children's Mobility and Accessibility Patterns. *Children, Youth and Environments* 24(1): 1-24.

Eisenberg, Y, Venderbom, K.A. & Vasudevan, V. (2017). Does the built environment moderate the relationship between having a disability and lower levels of physical activity? A systematic review. *Preventative Medicine* 95: 575-584.

French, S. (1993). Disability, impairment or something in between? In S. Swain, V. Finkelstein, S. French and M. Oliver (Eds.), *Disabling Barriers – Enabling Environments.* California, United States: Sage Publications.

Gleeson, B. (1999). *Geographies of Disability.* London: Routledge.

Goltsman, S. Outdoor Play Settings: An Inclusive Approach. In W.F.E. Preiser & J.H. Smith (Eds.), *Universal Design Handbook* (2nd Ed). New York, United States: McGraw-Hill Companies.

Hall, E. (1999). Workspaces: Reconfiguring the disability – employment debate. In H. Parr & R. Butler (Eds.), *Mind and Body Spaces: geographies of illness, impairment and disability* (pp. 138-154). London, United Kingdom: Routledge.

Hersh, M.A. (2016). Improving Deafblind Travelers' Experiences: An International Survey. *Journal of Travel Research* 55(3): 380-394.

Hersh, M, Ohene-Djan, J. & Naqvi, S. (2010). Investing Road Safety Issues and Deaf People in the United Kingdom: An Empirical Study and Recommendations for Good Practice. *Journal of Prevention & Intervention in the Community* 38: 290-305.

Human Rights Act, No. 82. (1993). Retrieved from http://www.legislation.govt.nz/act/public/1993/0082/latest/DLM304212.html

Human Rights Commission. (2005). *The Accessible Journey: Report of the Inquiry into Accessible Public Land Transport.* Auckland, New Zealand.

Imrie, R. (1996). *Disability and the City*. New York, United States: St Martin's Press.

Imrie, R. (1999). The body, disability and Le Corbusier's conception of the radiant environment. In H. Parr & R. Butler (Eds.), *Mind and Body Spaces: geographies of illness, impairment and disability* (pp 25-45). London, United Kingdom: Routledge.

Imrie, R. (2010). Disability, Embodiment and the Meaning of the Home. In V. Chouinard, E. Hall & R. Wilton (Eds.), *Towards Enabling Geographies: 'Disabled' Bodies and Minds in Society and Space (*pp. 23-44). Surrey, United Kingdom: Ashgate Publishing.

Imrie, R. and Kumar, M. (1998). Focusing on Disability and Access in the Built Environment. *Disability & Society* 13(3): 357-374.

Kirchner, C.E., Gerber, E.G. & Smith, B.C. (2008). Designed to Deter - Community Barriers to Physical Activity for People with Visual or Motor Impairments. *American Journal for Preventative Medicine* 34(4): 349-352.

Koskina, A. & Hasanagas, N. (2011). *Non-Visual Landscape: Landscape Planning for People with Vision Problems.* Ibidem: Stuttgart.

Lifemark. (2017). *Design for Life.* Retrieved from http://www.lifemark.co.nz/

Local Government Act, No. 66. (1974). Retrieved from http://www.legislation.govt.nz/act/public/1974/0066/latest/DLM415532.html

Local Government Act, No. 84. (2002). Retrieved from http://www.legislation.govt.nz/act/public/2002/0084/167.0/DLM170873.html

Long, R.G. (1995). Housing design and persons with visual impairment: report of focus-group discussions. *Journal of Visual Impairment and Blindness* 89(1).

Manley, S. (2011). Creating an Accessible Public Realm. In W.F.E. Preiser & J.H. Smith (Eds.), *Universal Design Handbook* (2nd Ed). New York, United States: McGraw-Hill Companies.

McKeever, P., Dunn, D., Yantzi, N., Aslam, H., Doherty, S., Ruddick, S., Young, N. & Scott, H. (2015). Developing an Ethnography-based Accessibility Survey with and for Disabled Children. *Journal of Ethnographic & Qualitative Research* 10:69-86.

Ministry of Business, Innovation & Employment. (2014). *New Zealand Building Code Handbook.* Wellington, New Zealand.

Ministry of Business, Innovation & Employment. (2017). *Acceptable Solutions and Verification Methods: For the New Zealand Building Code Clause D1 Access Routes.* Retrieved from https://www.building.govt.nz/assets/Uploads/building-code-compliance/d-access/d1-access-routes/asvm/d1-access-routes-2nd-edition-amendment6.pdf

Ministry of Health. (2001). *Living with Disabilities.* Wellington, New Zealand. Retrieved from https://www.health.govt.nz/system/files/documents/publications/livingwithdisability.pdf

Moore, A. & Lynch, H. (2015). Accessibility and usability of playground environments for children under 12: A scoping review. *Scandinavian Journal of Occupational Therapy* 22(5): 331-244.

New Zealand Standard 4121 (2001) *Design for Access and Mobility: Buildings and Associated Facilities.* Wellington, New Zealand.

Office for Disability Issues. (2015). *Disability Action Plan 2014-2018: Update 2015*. Retrieved from https://www.odi.govt.nz/assets/Disability-action-plan-files/disability-action-plan-2014-2018-update-2015.pdf

Office for Disability Issues. (2016). *New Zealand Disability Strategy / Outcome 5: Accessibility.* Retrieved from https://www.odi.govt.nz/nz-disability-strategy/outcome-5-accessibility/
Office of the Deputy Prime Minister. (2003). *Developing Accessible Play Space: A Good Practice Guide*. London, United Kingdom.

Oliver, M. (1996). *Understanding Disability: From theory to practice.* New York, United States: St Martin's Press.

Ostroff, E. (2001). Universal Design: An Evolving Paradigm. In W.F.E. Preiser & J.H. Smith (Eds.), *Universal Design Handbook* (2nd Ed). New York, United States: McGraw-Hill Companies.

Parkin, J. & Smithies, N. (2012). Accounting for the Needs of Blind and Visually Impaired People in Public Realm Design. *Journal of Urban Design* 17(1): 135-149.

Parr, H. & Butler, R. (1999). New geographies of illness, impairment and disability. In H. Parr & R. Butler, (Eds.), *Mind and Body Spaces: geographies of illness, impairment and disability*. London, United Kingdom: Routledge.

Perry, M.A., Devan, H., Fitzgerald, H., Han, K., Liu, L. & Rouse, J. (2017). *Accessibility and usability of parks and playgrounds.* Disability and Health Journal xxx: 1-9.

Resource Management Act. No. 69. (1991). Retrieved from http://www.legislation.govt.nz/act/public/1991/0069/latest/DLM230265.html

Royal National Institute for the Blind. (1995). *The housing needs of people with a visual impairment.* United Kingdom: The Housing Corporation.

Sawyer, A. & Bright, K. (2014). *The Access Manual* (3rd Ed). Oxford, United Kingdom: John Wiley and Sons.

Schoon, G. J. (2010). *Pedestrian Facilities: engineering and geometric design.* London: Thomas Telford.

Sheehan, B., Burton, E. & Mitchell, L. (2006). Outdoor wayfinding in dementia. *Sage Publications* 5(2): 271-281.

Stafford, L., Adkins, B. and Franz, J. (2019) Bounded at the Driveway's Edge: body-space tensions encountered by children with mobility impairments in moving about the neighbourhood street, *Children's Geographies*
Published on-line July 2019: https://doi.org/10.1080/14733285.2019.1635992

Standards New Zealand. (2001). *NZS 4121:2001 - Design for Access and Mobility – Buildings and Associated Facilities.* Wellington, New Zealand. Retrieved from: https://www.standards.govt.nz/assets/Publication-files/NZS4121-2001.pdf?utm_source+MBIE

Statistics New Zealand. (2014). *Disability Survey: 2013.* Retrieved from http://archive.stats.govt.nz/browse_for_stats/health/disabilities/DisabilitySurvey_HOTP2013.aspx

Stephens, L., Scott, J., Aslam, H., Yantzi, N., Young, N.L., Ruddick, S. & McKeever, P. (2015). The Accessibility of Elementary Schools in Ontario, Canada: Not Making the Grade. *Children, Youth and Environments* 25(2): 153-175.

Stephens, L., Spalding, K., Aslam H., Scott, H., Ruddick, S., Young, N.L. & McKeever, P. (2017). Inaccessible childhoods - evaluating accessibility in homes, schools and neighbourhoods with disabled children. *Children's Geographies* 15(5): 583-599.

Story, M.F. (2011). The Principles of Universal Design. In W.F.E. Preiser & J.H. Smith (Eds.), *Universal Design Handbook* (2nd Ed). New York, United States: McGraw-Hill Companies.

Thapar, N., Warner, G., Drainoni, M., W, S.T., Ditchfield, H., Wierbicky, J. & Nesathurai, S. (2004). A pilot study of functional access to public buildings and facilities for persons with impairments. *Disability and Rehabilitation* 26(5): 280-289.

Treasure, Julian. (2012). *Why architects need to use their ears.* Retrieved from https://www.ted.com/talks/julian_treasure_why_architects_need_to_use_their_ears/up-next

World Health Organisation. (2011). *World Report on Disability.* Geneva, Switzerland. Retrieved from http://www.who.int/disabilities/world_report/2011/report.pdf

Wright, C.J., Zeeman, H. & Whitty, J.A. (2017). Design principles in housing for people with complex physical and cognitive disability: towards an integrated framework for practice. *Journal of Housing and the Built Environment* 32(2): 339-360.

Yantzi, N.M., Young, N.L. & Mckeever, P. (2010). The suitability of school playgrounds for physically disabled children. *Children's Geographies* 8(1): 65-78.