

Designing high density, inner city, residential developments for families with young children: A review of evidence for best practise

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Abstract: There are currently many families with young children living in inner city Melbourne, in high density apartment buildings designed for singles or couples without children, which has significant implications for children's health and development. This literature review formed part of a wider research project with the City of Yarra, an inner Melbourne Council with increasing numbers of young families dwelling in new, high-density apartments, to help inform the development of more family-friendly accommodation in the municipality. Following a systematic literature search and appraisal, ten studies were included in the literature review, and discussed using the WHO's four dimensions of housing framework categories, namely, home, dwelling, community and immediate environment.

Overall, the literature included adequate information on the needs of families with children living in high-density inner urban housing, but less on how these needs can be addressed through good planning and design practice. The literature revealed that when children and family needs are not considered in urban planning and development at a government level, these needs are often unable to be met due to a family unfriendly living environment, which can have detrimental effects on health. This paper makes recommendations for the design of high-density housing to meet these needs, and highlights the need for further research into good practise for high-density housing design in Australian cities, along with better integration of child friendly cities policies in urban planning and design policy.

Key Words: Child friendly Cities; Inner urban; High density; Apartments; Children.

Introduction

In Australia, cities have long been regarded as inappropriate places to raise children, with high density apartment living widely considered detrimental to a child's health and wellbeing (Costello 2005; Carroll et al 2011; Grifford 2007; Whitzman & Mizrachi 2009). Until recently, children were not factored into concepts of inner city residences. Instead, 'family friendly suburbs' have been ingrained in the Australian psyche as the ideal place for young families, with assumed dreams of an affordable detached home, backyard, and green open space central to modern residential planning, policy and development (Karsten 2009; Costello 2005; Birrell et al 2012; Whitzman & Mizrachi 2009). Consequently, most high rise residential developments located in the inner suburbs of Australian cities are not designed with young families in mind (Costello 2005; Whitzman & Mizrachi 2009; Birrell et al 2012).

Despite this prevailing urban discourse of child-free cities and family friendly suburbs, there has been a steady increase in families with young children residing in the inner city, often in high density apartment buildings not designed for them (City of Melbourne 2013; Costello 2005). This is significant, as housing that does not meet the needs of its residents has been linked to negative health and wellbeing outcomes (Foster et al 2011).

Recently there has been a shift towards recognising children as inner city inhabitants, however there is currently limited evidence on what the housing needs of these families with young children are, and how these can be addressed through good practise in high density residence design and development. This literature review forms part of a wider research project with the City of Yarra, an inner urban municipality that includes ten inner eastern and northern suburbs of Melbourne, Victoria, to explore how high density residential design and development can better meet the needs of families with young children.

The City of Yarra is currently experiencing high levels of population growth, attributable to the significant numbers of new high rise apartment buildings, with this type of housing stock expected to be the dominant type of dwelling in the City of Yarra into the future (City of Yarra 2014). The prevalent demographic group residing in City of Yarra are young couples without children, who may seek to have children into the future and will therefore need appropriate housing, services and amenities (City of Yarra 2014). Currently, around one quarter of households are comprised of adult/s with dependent children, with most families having 1-2 children, with this demographic group steadily increasing (City of Yarra 2015). With high density developments becoming the dominant form of housing in this municipality, it is essential that the needs of families with young children be considered in the planning and development of future high density housing.

The aim of this research was to review current literature in order inform recommendations for best practise in designing high density inner urban housing to meet the needs of families with young children. Specifically, this literature addressed the following questions:

What are the needs of families with young children living in a high density inner urban environment?

What does current literature suggest is good practice in the design and development of new high density, inner-city residence to meet the needs of families with young children?

What recommendations can be drawn relating to housing design and urban planning for families with young children in Melbourne?

Methods

A systematic approach to reviewing the current evidence was taken. All literature identified in database searches were in the English language, published between 2005 and 2016 inclusive. Limiting the publication date to 2005 was important as there has been a shift in the past ten years to recognising the inner city as a place for young families, with current literature needed to inform good design practise (Costello 2004).

The population demographic of included literature was a significant consideration as the findings needed to be applicable to young families in Melbourne. Geographic limitations, where applicable, were imposed to include the regions of Australia, New Zealand, USA, Canada, UK, Netherlands and Scandinavia, due to the comparable demographic nature of these cities to Melbourne. Developing countries were excluded, as were Asia, the Middle East and some European countries, as cities in these regions have naturally developed urban centres which include mixed dwelling types, or have a tradition of families living in inner urban areas and are not comparable to Australia.

Databases from the fields of health, planning and design were included. Through initial database searching with key terms, 29 potentially relevant articles were identified after the reading the titles and abstracts of the results, as below:

Research question	Search terms	Database	Results	Accessed in full text
What are the needs of families with young children living in an inner urban environment?	('inner urban' OR 'high density' OR city OR 'urban population' OR 'high density living' OR cities) AND ((Flat* OR apartment* OR housing OR neighbo#rhood* OR communit* OR home OR reside* OR house OR 'high rise' OR live) AND ('child friendly' OR 'child friendly city' OR child OR children OR 'families with young children' OR 'young famil*') AND planning AND needs	Academic search complete	63	4
		Greenfile	13	0
		Urban studies abstracts	45	6
		Global health	19	0
		Environment complete	23	1
		Meline complete	22	2
		Art & Architecture Source	24	1
What does current literature suggest is good practice in the design and development of inner-city residence to meet the needs of young families?	(urban OR 'inner urban' OR 'high density' OR 'city' OR 'high density living' OR cities) AND (flat OR apartment OR 'high rise') AND ('child friendly' OR children OR child OR 'families with children' OR 'families with young children' OR 'young families') AND (planning OR 'new development' OR building OR guidelines)	Academic search complete	100	8
		Greenfile	4	2
		Urban studies abstracts	13	4
		Global health	6	0
		Environment complete	9	1
		Medline complete	8	0
		Art & Architecture Source	37	0

Searching was discontinued when articles identified through previous searches were recurrently retrieved. Reference lists of these studies were reviewed, and a further 18 articles deemed potentially relevant. These 47 studies were then accessed in full text for further evaluation. The studies were read, and further inclusion/exclusion criteria applied.

When accessed in full text, studies were considered for further inclusion if they met the following requirements; the results were useful in addressing the research question, and they had a study population of children or young families residing in a high density, inner urban area, comparable to the demographics of Melbourne. Studies were excluded if they did not meet these requirements.

This inclusion criteria was met by 14 studies. All studies were either qualitative studies or mixed studies. To examine the quality of the literature, the Critical Appraisal Skills Program (CASP) appraisal tool for qualitative studies was used to evaluate the articles. The CASP appraisal tool for qualitative literature provides a checklist of 10 questions designed to assist in the appraisal of literature. These ten questions were applied, with answers 'Yes' 'No' and 'can't tell' resulting in a final score out of 10. Studies that were low scoring on the CASP tool (6 or less 'no' answers) were disregarded, leaving 10 articles for inclusion in the literature review.

Results

There were ten studies included in the literature review, of which three were mixed methods, and seven qualitative, with a range of data collection methods. The studies were carried out in Australia, New Zealand, Scandinavia and the Netherlands. The key limitations of many of the studies were their small sample sizes, and some studies had a study population that included both parents, children and others, or included low, medium and high density housing mixes, not exclusively high density.

There were recurring themes identified in the ten studies around the housing needs of families with young children living in a high density, inner urban environment. These were categorised according to the World Health Organisation (WHO) Four Dimensions of Housing Framework, which understands the overall concept of housing to encompass home, dwelling, community and environment.

Figure 1: The WHO's four dimensions of housing (Bonnefoy 2007 pp 414)



Home refers not just to the immediate living environment, but to the perceived private, safe space that is considered home, a refuge from the outside world (Bonnefoy 2007). A safe, private and intimate home contributes to health and wellbeing, as well as an individual and family sense of belonging, attachment and identity (Bonnefoy 2007). In this review, home will include the internal apartment including space and storage, layout and design features. Dwelling refers to the actual building, and in this review will include the residential building design, and communal spaces and amenities. In the World Health Organisation framework, community refers to the community built within a neighbourhood or city quarter. In this review however, community will focus on the social connectedness and sense of community within the residential apartment building. Immediate environment refers to urban design and infrastructure within the neighbourhood in which the apartment building is situated, and in this review will incorporate independent mobility and play, street scapes, neighbourhood destinations and local infrastructure.

Findings & Discussion

Home

The literature search undertaken for this review found only two relevant articles related to the concept of home (Nethercote & Horne 2016; Carroll et al 2011). These studies were based in Melbourne, Australia and Auckland, New Zealand, where inner urban, high density apartments have been built to meet the needs of adult singles and couples. They mostly focused on negative apartment design aspects families with children experience living in apartments not designed to meet their needs and did not make any explicit recommendations for high density apartment design.

In terms of the needs of families, the studies focused on outlining the living issues experienced by families who reside in small apartments not designed for them, and some suggestions for improvements. The most commonly cited complaints by families were around lack of internal apartment space, storage space, and poor quality and design (Nethercote & Horne 2016; Carroll et al 2011). This is significant, as living space shortage results in lack of control over one's living environment, including limitations on privacy and living practises, which can affect family relationships and mental health (Evans et al 2001). This was identified by Nethercote & Horne (2016) and Carroll et al (2011) with participants of both studies observing that lack of apartment space resulted in stress and strained family relationships.

Poor building quality was also an issue identified by Nethercote & Horne (2016) and Carroll et al (2011). Families residing in small apartments with children reported that they often had second bedrooms that used borrowed natural light, and had to trade privacy for natural light when closing off rooms (Nethercote & Horne 2016; Carroll et al 2011). Exposure to natural light has been found to impact on the health and wellbeing of children and adults, with studies linking lack of exposure to natural light with depression and obesity (Pattinson et al 2016; Harb et al 2015). Poor soundproofing was another major issue highlighted in the literature. Exposure to noise pollution has been linked to negative health outcomes, including hyperactivity, emotional symptoms and conduct problems in children, and poor emotional health, hypertension, cardiovascular disease, sleep disturbance in adults (Dreger et al 2015; Clark & Stansfeld 2007; Pujol et al 2014). These complaints around apartment size and quality highlight the need for the development of evidence based minimum standard guidelines for high density, inner city housing for families with children. The lack of current evidence that explicitly include design recommendations for apartments to meet the needs of families with young children further indicates there is a need for additional research, in order to elicit recommendations for best practise on which to base these guidelines.

Until recently, there have been minimal apartment design guidance from the Victorian Government, resulting in the development of poor apartment designs which provided inadequate living environments (Victorian State Government 2016). The Better Apartments Design Standards (Victorian State Government 2016), implemented in March 2017, provides design standards to improve apartment liveability, including minimum standards on room depth, ceiling height, window location and layout, storage, soundproofing, open space, communal facilities and landscaping. These design standards, while an important initial step towards providing healthier high density housing in Melbourne, fail to make any recommendations explicitly around apartment design for families with young children.

The development of high density housing guidelines for families with young children is needed in Victoria. The Vertical Living Kids report, prepared by Whitzman & Mizrachi (2009) to make recommendations on best practise in planning high rise housing in Melbourne to allow for children's independent mobility, identified that while many municipalities in Victoria subscribed to The United Nations (UN) Child Friendly Cities (a framework on which governments can implement the UN Convention on the Rights of a Child into local government processes [UNICEF 2004]), they did not include the needs of families with young children in residential design and development policies and guidelines. Whitzman & Mizrachi (2009) further identified Singapore and Vancouver as having best practise policies to support children living in high rise environments. The City of Vancouver's (1992) 'High density housing for families with children guidelines', for example, provide minimum standards for high density housing design including guidelines for project planning, building design, and apartment design. This includes minimum standards for space and storage within apartments, quality of building materials, neighbourhood compatibility, minimum percentages of two or three bedroom apartments within a development, recommendations on apartment location within the building, and the provision of communal spaces.

The use of these guidelines have been successful in seeing Vancouver become one of the most family friendly cities in North America, with over a third of inner city households being made up of families with children, and a third of these living in high density housing (City of Vancouver 2016). Whitzman & Mizrachi (2009) recommend that municipalities in inner urban Melbourne develop similar evidence based guidelines that include explicit recommendations around designing high density apartments to meet the needs of families, to ensure the provision appropriate housing for families into the future.

Dwelling & Community

Dwelling in this review refers to the design of the residential building, including common shared spaces and amenities. The literature revealed three main themes concerning the design of apartment buildings and family friendliness; social connectedness, playable space and communal facilities. While dwelling and community are considered separate aspects under the WHO dimensions of housing framework, the

reviewed literature highlighted how building design and community are closely interlinked, with social connectedness being prompted or impeded by building design.

Social connectedness and engagement with a community has a crucial role to play in the health and wellbeing of both parents and children living in high density inner urban environments (Chile et al 2014; Karsten 2007). Social isolation was experienced by many inner city families across a broad range of reviewed studies, with reasons including poor parking and limited space restricting visits from friends and families, limited contact with neighbours, and being the only, or one of few, families with children in the building or neighbourhood (Chile et al 2015; Nethercote & Horne 2016; Carroll et al 2011; Whitzman & Mizrachi 2012).

The need for the creation of a 'vertical neighbourhood' within a residential building to improve social connectedness was prominent in the literature. The key suggestions for the creation of vertical neighbourhoods were to design apartment buildings to include shared communal spaces in which residents, including children, can play and interact (Whitzman & Mizrachi 2012; Karsten 2009; Carroll et al 2011; Chile et al 2015). The provision of a school within the neighbourhood was also found to be a facilitator to social connectedness, as was urban design that allowed casual encounters between neighbourhood residents (Lilius 2014; Nordstrom 2010; Carroll et al 2015).

The demographic characteristics of building residents was also found to be a barrier or facilitator to social connectedness. Karsten (2009) and Chile et al (2015) found that families wanted to have long term, 'like-minded' neighbours who would invest in a social relationship, and highlighted the need for there to be a 'critical mass' of families with young children within a residential building in order to aid the development of a vertical neighbourhood of families. Allowing for a 'critical mass' of families within a building could be facilitated by providing numerous family sized apartments, as well as making the residence attractive to families through neighbourhood location and family friendly building design features.

Lack of play space within apartments was identified as a major barrier to active play at home (Nethercote & Horne 2016; Carroll et al 2011). Active play is essential for children, contributing to healthy development, environmental literacy and social skills (Ergler et al 2013). The provision of communal play spaces within the apartment building was suggested to facilitate active play, with the literature advising small play spaces observable from apartments for children under six, spaces outdoors but within the residential enclave recommended for children seven to twelve, and play spaces within the neighbourhood setting suitable for children over twelve to explore with some independence (Whitzman & Mizrachi 2012; Shargi et al 2014; Carroll et al 2011).

These findings further highlight the need for family friendly building design guidelines that include recommendations on the inclusion of building features that promote social connectedness and active play for families with young children, particularly communal spaces that welcome children. A minimum percentage of apartments with two or more bedrooms would also encourage a critical mass of families within the building. Adequate building access and parking, as well as neighbourhood location, also needs to be considered in order to improve social connectedness. An example of the successful inclusion of these aspects of design can be found in The City of Vancouver's (1992) 'High density housing for families with children guidelines', which provide guidelines for the provision of adequate parking, play space, communal facilities and housing mix within a development, to facilitate social connectedness and active play.

Immediate environment

Immediate environment refers to urban design and infrastructure in the neighbourhood in which the residential building is situated. The literature highlighted inner city children's need to engage with and explore their immediate environment, and discussed the barriers faced by inner city children in accessing spaces in their neighbourhood, with the need for child friendly urban design to facilitate independent mobility, active play and social connectedness being emphasised.

The literature identified that children living in high density apartments are less active, and less independently mobile, than their suburban dwelling counterparts (Carroll et al 2011; Karsten 2007; Nordstrom 2016; Whitzman & Mizrachi 2012; Ergler et al 2015). This is significant, as active play and independent mobility are important to child development, and can contribute to environmental literacy, identity and belonging, social skills, risk perception and capabilities, and overall wellbeing (Crawford et al 2017; Carroll et al 2015; Whitzman & Mizrachi 2009; Ergler et al 2012). Independent mobility has been linked to an increase in the level of active play undertaken by a child, and limitations to active play have

been linked to increases in childhood obesity, cardiovascular disease and diabetes, and being overweight later in life (Schoeppe et al 2014; Whitzman & Mizrachi 2009).

Children have different needs for play across the lifespan, so providing a hierarchy of play spaces with the residential building, and broader neighbourhood, was suggested as being good practise (Whitzman & Mizrachi 2012; Shargi et al 2014; Carroll et al 2011). While designated children's play spaces were identified as important spaces for active play, the literature also emphasised that inner city children desire to explore and experience their environments without limitations, rather than being confined to spaces designed for them. Children used spaces such as car parks, foyers, sidewalks and alleyways for socialisation and play, highlighting the need for all aspects of urban planning and design to consider the needs of children, and the need for the implementation of child friendly urban design policies (Carroll et al 2015).

The need for children and parents to feel safe in their neighbourhood was highlighted in the reviewed literature, with safety concerns around children independently accessing spaces in their neighbourhood a common theme. Both parents and children identified traffic and 'stranger danger' as the main concerns that prevented children independently mobilising and accessing neighbourhood destinations (Carroll et al 2010; Karsten 2007; Nordstrom 2016; Whitzman & Mizrachi 2009; Ergler et al 2012; Ergler et al 2015). This is significant, as children's access to urban spaces is important to improve social interaction and contribute to an individual's sense of identity and belonging, which children are unable to develop if their access to these spaces is limited due to safety fears (Carroll et al 2015).

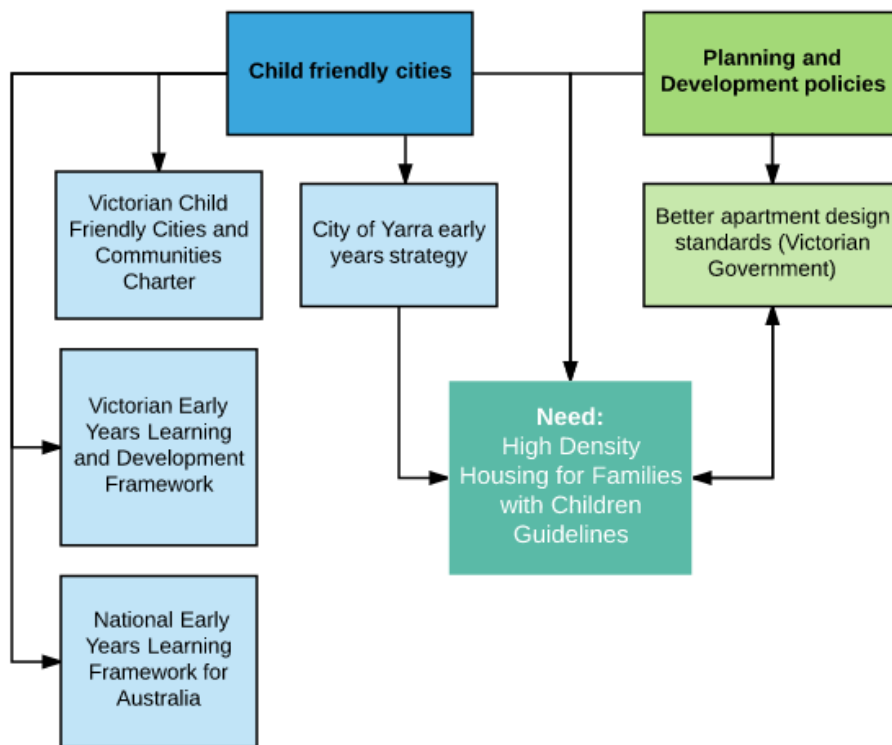
There were no recommendations in the reviewed literature on reducing the fears around 'stranger danger' to promote more independent mobilisation; most recommendations focused on increasing traffic safety. Suggestions on increasing traffic safety to facilitate more independent mobility included designated walking and bike tracks, more pedestrian crossings, car calming measures, (Carroll et al 2015; Nordstrom 2010; Ergler et al 2015). Interestingly, Foster et al (2015) suggest that increased neighbourhood walkability, which encourages pedestrian traffic, alleviated some parental fears around stranger danger by allowing more natural surveillance of children by pedestrians. DeMeester et al (2014) further suggest that providing neighbourhood destinations and schools within a convenient distance to a child's residence would also promote independent mobility.

The literature highlighted the need for family friendly residential developments to be thoughtfully located within the city, within a neighbourhood that provides infrastructure that meets family's needs. Proximity to public transport, and reduced time spent commuting to work was seen as a major pull factor for city living for parents across multiple studies (Lilius et al 2014; Karsten 2009; Carroll et al 2011). Across the literature, children valued having access to destinations designed for their entertainment such as theatres, shops and parks, and having a school within the neighbourhood was also highlighted as a significant need (Ergler et al 2015; Nordstrom 2010; Carroll et al 2015; Whitzman & Mizrachi 2009; Karsten 2009; Lilius et al 2014). Likewise, parents across multiple studies reported that the cosmopolitan nature of the city, cultural diversity, and close proximity of features such as markets, museums and shops were a significant factor in their decision to raise children in an inner urban environment (Karsten 2009; Whitzman & Mizrachi 2012; Carroll et al 2015). This further highlighted the importance of providing high density housing for families with children guidelines which include recommendations on residential development site selection.

Findings in relation to the immediate environment are consistent with recommendations from the UN Child Friendly Cities framework. This outlines that for a city to be considered child friendly, children must have the opportunity to be included in decision making processes, and be considered equal citizens with safe access to all aspects of their cities including being able to explore their neighbourhood, meet friends and play, and participate in their community (UNICEF 2004).

While the Child Friendly Cities Framework has informed some Federal, State and Local Frameworks, Charters and Policies in Australia (See Figure 2), these currently exist parallel to local and state government urban design and planning policies and guidelines, highlighting a gap in current policy. This indicates that there is a need for further integration of the Child Friendly Cities framework into urban design and development policies and guidelines. The development of high density housing for families with children guidelines in Victoria, which would include explicit recommendations around designing high density apartments to meet the needs of families with young children, would help meet this current gap in policy.

Figure 2: The policy environment



Recommendations

Recommendations arising from this review are outlined below in terms of design, policy and research.

Development & Design

The following summarises the recommendations around designing inner city new high density, inner city developments to meet the needs of families with young children drawn from the literature:

1. Internal apartment space that meets the spacial needs of families with children
2. Better quality apartment layout, design and building materials
3. The provision of a hierarchy of play spaces for children across different age ranges within the residential building
4. The provision of communal spaces within the residential building that welcome children
5. A minimum number of two and three bedroom apartments within the building to allow for a 'critical mass' of families
6. Ample parking for residents guests
7. The provision of a school within the residential neighbourhood
8. Child friendly urban planning and design to allow for independent mobility and active play

Research

The literature review revealed only two articles concerning apartment design for children for young families. The recommendation therefore is:

1. Further research into best practise of apartment design to meet the needs of families with young children
2. Further research on current international guidelines on developing high density housing for families with young children, and how these could inform the development of similar guidelines in Australia

Policy & Guidelines

For the needs of families with young children living in a high density, inner urban environment to be met, there also needs to be a meaningful integration of these needs into planning and design policy. The policy and guideline recommendations arising from this literature review are for:

1. Development of local government policies that ensure meaningful consultation and participation with parents and children in urban planning and design, and the decision making process

2. Development of evidence based guidelines for designing and developing high density housing for families with young children in Melbourne

Limitations

A major limitation to this literature review was the limited amount of research available. While there was some research into the needs of families with young children residing in high density, inner urban environments, there was very limited literature around high density apartment design to meet these needs, with very limited findings and recommendations on best practise guidelines. Both the national and international literature reviewed identified that children have only recently been recognised as inner city residents by policymakers, so this limited literature is unsurprising, and highlights the need for further research into best practise in meeting the needs of families with young children living in high density inner urban environments.

As this literature review formed part of a wider project with the City of Yarra, the aim of the review was to make evidence based recommendations suitable for implementation in the Melbourne context. Due to the lack of Australian-based research however, literature from other western countries such as New Zealand, Sweden, Canada and the Netherlands was included. While the study demographics and urban landscapes in which the studies were set was reviewed, and the literature included only if it was assessed to be comparable to Melbourne, this was a subjective process, meaning some recommendations from overseas studies may not be applicable to the Melbourne context.

Limiting the search criteria to include Australia and other western countries also meant that some potentially relevant literature was excluded. It was noted during the literature search stage that there was potentially relevant literature around children living in high density residences from studies based in Asia. This literature may have provided some valuable recommendations around apartment design and planning for families with young children, however assessing the appropriateness of these recommendations to the Melbourne context was beyond the scope of this review.

Conclusion

This literature review found that there is currently adequate available evidence around the needs of families living with young children in high density, inner urban environments. The main needs of these families identified in the reviewed literature was for apartments with sufficient space and with good quality design and building materials, social connectedness, independent mobility and active play for children, safety, and family friendly neighbourhood design and infrastructure.

The review identified less evidence for good practise recommendations in design and development of new residences to meet these needs, however some recommendations have been drawn. The literature revealed that when children and family needs are not considered in urban planning and development at a government level, these needs are often unable to be met due to a family unfriendly living environment, which can have detrimental effects on health. While Victoria has adopted the Child Friendly Cities approach, this framework is not currently used to inform planning and development policies. This highlighted the need integration of these policies, and the development of evidence based guidelines around high density housing for families with children to be developed and implemented in Victoria.

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