Examining associations between area-level spatial measures of housing with selected health and wellbeing behaviours and outcomes in an urban context

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ARTICLE INFO

ABSTRACT

Adequate and affordable housing is a major social determinant of health; yet no work has attempted to conceptually map and spatially test area-level measures of housing with selected health and wellbeing outcomes. Sourcing data from 7,753 adults from Melbourne, Australia, we tested associations between area-level measures of housing density, tenure, and affordability with individual-level measures of neighbourhood safety, community satisfaction, and self-rated health. Compared with the reference groups, the odds of: feeling unsafe was higher for residents living in areas with less affordable housing; community dissatisfaction was ~30% higher in those living in areas with > 36% residential properties assigned as rentals, and was significantly higher in the least affordable areas (OR =1.57). Compared with the reference groups, as dwelling density, proportion of rental properties, and housing unaffordability increased, the odds of reporting poorer self-rated health increased; however these associations did not always reach statistical significance. This work highlights the benefits of evidenced-based planning spatial measures to support health and wellbeing.

1. Introduction

More than half of the world's population now live in cities, and this is expecting to rise to five billion people by 2030 (United Nations Population Fund, 2007), and within high income countries, the vast majority of people (~86%) already reside in urban settings (United Nations Department of Economic and Social Affairs, 2014). In these contexts, often the more desirable parts of the city are frequently served with more amenities and public transport (e.g. inner-city suburbs), and these are becoming increasingly unaffordable (Currie and Delbosc, 2011). To accommodate population growth, a frequently employed strategy in North America and Australasia since the 1950's is to release new land for development on the urban fringe of cities (Currie and Delbosc, 2011). Urban fringe developments offer lower cost, more 'affordable' housing, particularly when only the cost of the house and land package is considered (Currie and Delbosc, 2011). However, these new developments tend to be located in sprawling, low residential density communities with limited local infrastructure and poor access to local employment opportunities, shops and services and public transport infrastructure; therefore other costs, such as longer

journeys to work and reduced local opportunity, are incurred (Giles-Corti et al., 2012). Hence, urban fringe developments tend to increase motor vehicle dependency and are associated with less walking, cycling, and public transport use (Badland and Schofield, 2005). In this respect, low residential urban fringe locations could be said to be providing 'affordable' housing, but are not necessarily located in 'liveable' neighbourhoods.

Liveable communities are defined as places that are: 'safe, attractive, socially cohesive and inclusive, and environmentally sustainable; with affordable and diverse housing linked via convenient public transport, walking, and cycling infrastructure employment, education, public open space, local shops, health and community services, and leisure and cultural opportunities' (Lowe et al., 2013). Therefore, to create healthy liveable communities, housing strategies that support access to local amenity are required to accommodate an increasingly urbanising population. This includes concentrating new growth in areas well served by public transport infrastructure and being able to accommodate a mix of housing types, commerce, retail, light industry, and recreation. Creating more compact higher density mixed use development is desirable as it maximises the use of existing infra-

structure while minimising service costs and potentially commute travel times by providing local employment opportunities (ISO/TC 268, 2014). Importantly, if high-quality high density housing is made proximal to neighbourhood amenities, it has the potential to enable local living (Newton and Glackin, 2014). An Australian example from Victoria is the '20 min neighbourhood'. This strategy seeks to enable residents to live locally by providing the amenity required for daily living within a 20 min journey of home (State Government Victoria, 2014).

Higher residential densities have the potential to benefit health and wellbeing, particularly if located in neighbourhoods with accessible, frequent public transport services, and a variety of shops and services. These types of neighbourhoods have been shown to promote positive health behaviours by encouraging walking, cycling, transit use, and reduced sitting time, while supporting the provision of local shops and services (Giles-Corti et al., 2012). Proximal retail destinations attract pedestrians, and produce a range of positive social attributes and outcomes (Wood et al., 2008). More people on the streets promotes natural surveillance, which makes neighbourhoods look and feel safer, while also promoting social interactions (helping to create social capital) (Leyden, 2003; Rogers et al., 2011). Living in neighbourhoods with higher levels of social capital, regardless of neighbourhood disadvantage, has been linked to better health (Diez Roux et al., 2001; Elgar et al., 2011), with this association more pronounced in urban settings (Mohnen et al., 2011). However, areas with many destinations available tend to attract strangers from outside local communities, which may reduce social capital (Wood et al., 2008). For example, early studies indicate in areas with high levels of pedestrian activity, residents may withdraw into the private realm to regulate their exposure to strangers (Baum et al., 1978) and neighbours (Appleyard and Lintell, 1972). Hence, residents of denser urban environments may select these areas with a tacit acceptance that there may be trade-offs to living in more accessible, vibrant neighbourhoods (Foster et al., 2014).

In many developed countries home ownership is preferred over private rental tenure (Diaz-Serrano, 2009). This is often supported by government policies that ease the pathway into home ownership (Gilbert, 2016). In Australia for example, first homebuyers are offered subsidies, which in some states includes reductions in government taxes when first homes are purchased or dwellings are purchased off plans (e.g. New South Wales First Home Owner Grant schemes, Victoria Off-the-Plan Concession scheme). Compared with renting, home ownership is thought to yield individual-level social and economic benefits including financial security, access to credit, wealth generation, self-esteem, social status, housing satisfaction, as well as community benefits including neighbourhood stability, improved property upkeep and area attractiveness, community engagement (Huang et al., 2015; Rohe et al., 2001). However, home ownership can result in mortgage stress and restricted mobility, particularly when ownership constrains residents relocating 'upwards' from disadvantaged or declining neighbourhoods (Rohe et al., 2001) or when their housing needs change (e.g. requiring age-friendly housing).

A bi-directional relationship has been shown between housing affordability and health, suggesting physical and mental health status influences the type of housing one can afford, and vice versa (Baker et al., 2014). These effects are most pronounced for more vulnerable populations, such as single parent and low income households (Baker et al., 2014; Bentley et al., 2011). Indeed, it is likely that housing affordability impacts the health and wellbeing of residents in at least two ways. First, those with a limited budget and resources may make trade-offs between housing affordability and location and access to employment, education, and services required for daily living, including schools, recreation, retail, services, and food availability (Currie and Delbosc, 2011). This increases time spent commuting and in sedentary activities while reducing opportunities for local physical and social activities. Second, for those living within restricted budgets, the

suitability of available housing may be compromised, which can lead to living in poorer quality dwellings (Howden-Chapman, 2002) or neighbourhoods (e.g. high crime and incivilities), and situations of overcrowding. A large body of literature shows that poorer quality housing (e.g. inadequate insulation, lack of heating) and overcrowding are associated with reduced housing satisfaction (Giles-Corti et al., 2012), poorer mental health, higher rates of contracting infectious diseases, respiratory problems, and injuries (Howden-Chapman, 2002; Baker et al., 2013; Krieger and Higgins, 2002). These impacts may be exacerbated for those living in unsafe neighbourhoods, who may constrain their social and physical activities (Foster and Giles-Corti, 2008).

Although this work has been conceptualised from an international perspective, it uses Australian data (from metropolitan Melbourne, Victoria) to build a case for demonstrating how a suite of housing 'liveability' indicators could be developed, applied and monitored in future to create communities that support health and wellbeing. Australia is one of the most highly urbanised countries in the world, and its capital cities are renowned for being unaffordable, particularly Sydney and Melbourne (Major Cities Unit, 2013). There is also a high rate of home ownership with the majority of the population living in suburbs, most of which are low-density (Major Cities Unit, 2013). With Australia's population expected to reach 42 million by 2050 (currently at 22 million) (Major Cities Unit, 2013), there is pressure to increase densities in the inner and middle regions of the city to provide affordable housing options to accommodate this rapid growth (Department of the Prime Minister and Cabinet, 2016).

This study sought to create and test spatial measures of housing and pathways hypothesised to be associated with health and wellbeing. From a policy perspective it remains challenging to plan cities that equitably provide housing that supports health and wellbeing; and spatial data have been rarely used to understand the delivery of housing. Working under the umbrella of liveability, this work can help build the evidence-base for urban planners and policy-makers to support city-shaping activities needed to support health-promoting housing across an urban region, and to monitor its delivery over time. Accordingly, the aims of this paper were to: 1) conceptualise the range of pathways through which housing in urban settings impact health and wellbeing behaviours and outcomes; 2) spatially operationalize measures that map to these pathways; and 3) test associations for how selected housing measures relate to health and well-being in an urban context.

2. Methods

2.1. Housing conceptual framework development

A housing conceptual framework was developed using a social determinants of health lens (Fig. 1) that considered upstream (e.g. neighbourhood attributes) and downstream (e.g. perceptions, behaviours, outcomes) determinants of the health and wellbeing impacts of housing within an urban context (Baker et al., 2014; Howden-Chapman, 2002; Strategic Review of Health Inequalities in England post-2010, 2010; Cervero and Duncan, 2006; Macintyre et al., 2003). Three different methods were used to develop the conceptual framework: 1) a review of housing-related urban planning and policy documents; 2) a review of scientific literature to identify housing measures used elsewhere; and 3) an academic assessment of the 'meaningfulness' of the identified measures from a spatial perspective. Once developed, the housing conceptual framework was used to identify suitable upstream neighbourhood-level spatial measures associated with selected housing-related behavioural, intermediate, and long-term outcomes.

There were two considerations for selecting the housing measures. First, the measures identified needed to be spatially attributable (i.e. the unit of measurement had to be within a spatially defined boundary)