Where do they go and how do they get there? Older adults' travel behaviour in a highly walkable environment

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ABSTRACT

Mobility—the ability to move about in one's neighbourhood and maintain independence—is essential for older adults' wellbeing. Neighbourhood environments support or hinder mobility especially as health declines and physical vulnerability increases with age. Linkages between mobility and planning and policy are key to designing age-friendly neighbourhoods with destinations that encourage older adults to get out and be physically active. We describe the mobility of older adults who live in a highly walkable neighbourhood. Specifically, we address the questions of 'where do older adults go?' (destinations) and 'how they get there?' (travel mode, physical activity). We recruited older adults (age 60+) who live in Vancouver's downtown core, an area acknowledged to be highly walkable (Walk Score®: 94—97/100), and who leave their houses most days of the week. Participants ($n = 184$) recorded travel in diaries and wore an ActiGraph GT3X + accelerometer for 7 days during September to October 2012. We classified reported destinations according to the North American Industry Classification System, and analysed mobility [trip rates (overall and walking), steps, moderate to vigorous physical activity (MVPA)] and associations between travel and physical activity-related mobility measures. Key destinations were grocery stores (13.6% of trips), restaurants (7.2%), malls/marketplaces (5.5%), and others' homes (5.4%). Participants made 4.6 (std: 2.5) one-way trips/day, took 7910.1 (3871.1) steps/day, and accrued 39.2 (32.9) minutes/day of MVPA. Two-thirds of trips were by active modes (62.8% walk, 3.2% bike) and 22.4% were by car. Trip rates were significantly associated with physical activity outcomes. Older adults living in highly walkable neighbourhoods were very mobile and frequently used active transportation. Travel destinations signify the importance of nearby commercial and social opportunities, even in a highly walkable environment. The high rates of active travel and physical activity in a walkable neighbourhood suggest that when provided compelling destinations, community dwelling older adults walk more and may achieve health benefits through daily travel.

1. Introduction

The proportion of people aged 60 years or older is growing more rapidly than any other age group in most countries around the world (World Health Organization, 2014). As increasingly scarce resources must be allocated to care for this ageing demographic, it is imperative we identify factors that most effectively support older adults to maintain their independence, health and quality of life. Mobility—the ability to physically get out in one's neighbourhood and maintain independence in daily activities—is essential for older adults' wellbeing and quality of life (Webber et al., 2010). Numerous health consequences such as impaired physical function, restricted social participation and institutionalisation are associated with mobility limitations (de Vries et al., 2012). Older adults are particularly vulnerable to neighbourhood design as health declines with ageing (Yen and Anderson, 2012). Thus, there is a need to better understand the myriad factors that contribute to older adults' outdoor mobility and their capacity to successfully age in place.

Mobility is defined differently across disciplines. From a clinical health perspective, mobility encompasses participation in social and physical activities and the ability to perform specific movements such as walking, climbing stairs and instrumental activities

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of daily living (Canadian Institutes for Health Research, 2007). In ageing and physical activity literature, mobility is operationalised by physical activity, such as walking or moderate-to-vigorous physical activity, per day or per week. Mobility has also been measured with the "life space" concept (Stalvey et al., 1999), which estimates the extent of travel, on a continuum from bed-bound to long-distance excursions. Built environment literature typically defines mobility as walking or active transportation, and aims to understand what neighbourhood features support increased use of walking (A.C. King et al., 2011; W.C. King et al., 2003; Nathan et al., 2012; Rosso et al., 2011; Yen and Anderson, 2012). Finally, the transportation field defines mobility using travel behaviour measures, typically trips per day (often both motorised and non-motorised) and distance travelled (e.g., vehicle kilometres travelled) (Collia et al., 2003; Su and Bell, 2009).

Across all disciplines and definitions, there is clear evidence that mobility impacts health. Ageing and physical activity studies found that reduced mobility was associated with increased risk of chronic disease (Rejeski et al., 2011), falls and related injuries (Chodzko-Zajko et al., 2009), and functional limitations (Physical Activity Guidelines Advisory Committee, 2008). From the built environment literature, features such as residential and retail density, street connectivity, and land use mix were associated with regular walking in older adults (Frank et al., 2010; W.C. King et al., 2003; Nathan et al., 2012). Evidence generated from the transportation field showed that older adults take fewer trips, travel shorter distances and rely more heavily on personal vehicles, as compared to the general adult population (Collia et al., 2003; Scott et al., 2009). Across this interdisciplinary body of work it is clear that mobility — however defined — differs across age groups and neighbourhood environments, and that it has a significant impact on health. It follows, therefore, that by promoting mobility, or delaying its decline, we might enhance the health of older people.

We conceptualise mobility in older adults from an interdisciplinary perspective, bridging transportation, physical activity, and built environment research. We examine mobility both by motorised and non-motorised modes, with particular attention to walking given its health benefits and universality (Diehr and Hirsch, 2010). Our work is also guided by socio-ecological models of health promotion, where behaviour is influenced by multiple levels: individual, neighbourhood and policy (Sallis et al., 2006). A complex set of influences is at play with respect to older adults and the built environment (Hanson et al., 2012). At the individual level, we must acknowledge conditions that facilitate older adults' mobility (e.g., the presence of disease or disability, psychosocial factors, social networks). Equally, we need to recognise neighbourhood environments (the presence of destinations, sidewalks, benches, adequate lighting) and policy conditions (social programs, transit access, safety) that support or hinder mobility — even in the most walkable environments. We seek to better understand what promotes the mobility of active older adults who reside within a highly walkable neighbourhood. Their "success stories" provide insight into factors that promote active ageing — factors that can potentially be incorporated into other settings.

Our interdisciplinary research team addresses the question: "what makes a neighbourhood a good place to grow old?" Within this broader program of research we examined the mobility of older adults who live in one of Canada's most walkable neighbourhoods. We describe where older adults go (their destinations) and their mobility—how frequently they went out (trip rates), and how active they were (objectively measured physical activity). We examine the activity patterns of those living in a highly walkable, or "ideal", neighbourhood and compare this with those who live in more typical settings. Characterising older adults' activity patterns

in a highly walkable environment can inform planning and policy to promote age-friendly community design.

2. Methods

2.1. Context

The Active Streets, Active People Study is focused on the mobility and social interactions of community-dwelling older adults in Downtown Vancouver. The study area includes three adjacent neighbourhoods (the West End, Yaletown and Downtown core) which are home to approximately 100,000 people, about 16% of whom are aged 60 years and older (City of Vancouver, 2014). Our study area is one of Canada's most walkable areas (Walk Scores® of 94–97/100, termed "Walkers' Paradise") (Walk Score®, 2014). Walk Score® (www.walkscore.com) is a publicly available tool that generates a score based on distance to nearby amenities, intersection density and block length. Since highly walkable neighbourhoods are more 'unusual than usual', this context provided a unique opportunity to study the influence of living in a "Walker's Paradise" on older adult mobility.

2.2. Sampling frame and recruitment

We purchased consumer records from a marketing firm (info-CANADA) for households located within 400 m of a planned greenway where there was an adult aged 60 years or older. We mailed introductory letters to 3402 households. For recruitment, a research assistant followed up with potential participants after one week, making as many as five follow-up calls as needed. Supplementary recruitment included newspaper advertisements and snowball sampling. Eligibility criteria were: being 60 years or over, reporting leaving one's residence 3–4 times/week, living within the study neighbourhood and intending to stay for 2 years, and able to communicate in English. Each participant was provided a $20 grocery gift card in recognition of their time, and were required to sign to acknowledge receipt. Participants provided written informed consent prior to participation. Ethics approval for this study was granted by the University of British Columbia Behavioural Research Ethics Board (H12-00593) and Simon Fraser University Research Ethics Board (2012s0435).

2.3. Data collection

Survey measurement sessions occurred at two community-based facilities in September and October 2012. Participants completed questionnaires about their general health, physical activity, neighbourhood environment and social connections. We fitted participants with tri-axial accelerometers (ActiGraph GT3X+, ActiGraph LLC, Pensacola, FL, USA). At the end of each survey measurement session, the project manager provided each participant with detailed instructions to wear the accelerometer on the right hip during waking hours for seven days, and only to remove it for sleep and water-based activities (e.g., showers, swimming) and showed them how to record daily travel in a diary for the seven days following the in-person assessment. These instructions were also included in a take-home package with the trip diary. A "trip" was defined as one-way travel between two destinations (e.g., home to grocery store). For each trip participants recorded start and end location, start and end time, purpose (work, volunteer, exercise, education, shopping/errands, social/entertainment, health appointment, other), and travel mode (walking, bicycle, public transit, car, wheelchair/scooter, taxi).