How does the walking environment contribute to the ease of access?

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This study aims to identify the extension and causes of difficulties of walking / wheeling, in NZ urban environments, and produce practical resources for advocates, transport planners and urban designers.

Rationale and Significance of the Study

In New Zealand, 27% adults live with at least one impairment which makes their everyday activities more difficult[1,2]. Despite discourse on equity of participation[3–5], characteristics of street and transport system design still cause acute difficulties for foot or wheelchair access[6–13]. Poor street and transport system design reinforce or contribute to discrimination regarding participation, employment, income, education, health and well-being[1,6,14–17]. Addressing barriers to walking/wheeling is essential from a human rights perspective[3,7,10,15,18] and encourages walking within the broader population, with particular benefits for children and ageing adults[1,10,19,20]. It further contributes to physical activity[21–24], inclusion[17,25,26], economic efficiency[27,28] and sustainability[29,29–34]. Meaningfully improving the walking realm requires a good understanding of who has difficulties accessing their local destinations on foot/by wheelchair, what these difficulties are and what consequences they have[17,30,35–40]. This overview does not exist yet on the national[6,41,42] or local[i] levels.

This research supports the national and local visions of environments allowing people of all ages and abilities to access their destinations and contributing to better social, economic, and environmental outcomes in a pragmatic way. It is set up to identify population groups who experience difficulties of access and inform how the streets' environments can discourage walking or wheeling. It further contributes to the need to better understand the complex link between streets environments, people's perceptions and experiences, and their choices of walking/wheeling. It will lead to a practical decision support for the improvement of walking environments.

Key Aim and Hypothesis

The aim is to provide a meaningful feedback to the practice by identifying:
1. **The extension and causes of difficulties of access in NZ** (quantitative analysis);
2. **The causes of perceived difficulties of walking/wheeling to local destinations and their consequences** (understanding of Aucklanders' experiences and objective characteristics);
3. **The challenges and priorities for retrofit** (agreements / disagreements between local practitioners, and needs of inputs from the research).

The hypothesis is that the types and levels of impairments, trip purposes, and quality of available options will moderate the association between the streets' environments and walking/wheeling.

Principles

The core principles are:

- **The need to involve the users throughout the process**, and bring their voices to the planning practices
- **The need to gather specific local evidence** to prioritise retrofit
- **Working within the socio-ecological framework**, understanding an individual's choices within their broader context – physical ability, perceptions, constraints and obligations, street environment, destinations, and transport options available
- **Using the social model of disability**, emphasising the role of the environment in a person's ability to function, participate to everyday activities and access public places
- **Informing the types and levels of impairments** using the Washington Group Short Set, adopted by Statistics NZ[41], as recognised and comparable method.

Design of the Study

The study uses use quantitative analysis of Household Travel Survey data and qualitative investigation of local patterns (cross-sectional design with convenience sampling). The design is detailed against the aims.

Aim 1 Extension of the difficulties of access in NZ urban areas	Aim 2 Characteristics of the difficulties and their consequences	Aim 3 Retrofit challenges and priorities

Systematic literature review

involvement of Citizen Scientists

Study 1: Quantitative analysis, Household Travel Survey (HTS)

Study 2: Qualitative assessment in Auckland

Study 3: Practitioners' views: survey and workshop with users

Study 4: Research translation, recommendations for the practice

Aim 1. Extension and causes of difficulties of access

Quantitative assessment of the Household Travel Survey data[43] will inform the extension of difficulties of access in NZ urban areas and the correlation with the impairments, the trips made, the availability of a vehicle, and the choices of walking or using other modes of transport. This work has not been done yet, and the team has been granted access to the data for this purpose by the Ministry of Transport.

A systematic literature review will put these findings in the context of international evidence on how urban environments and perceptions of ease of access influence the choices of walking/wheeling.

Aim 2. What "difficult" means, in Auckland

In-depth interviews with 80 adults (18+) declaring difficulties to access their local environment will capture:

- overall perceptions of difficulty of walking/wheeling
- safety and pleasantness for walking/wheeling locally
- frequent trips: destinations, choice of transport mode and reasons, perceived ease of walking/wheeling, perceived barriers, availability of transport options (mapping and insights)
- destinations desired but not accessed, and reasons why
- demographic data including possible impairments.

The questions formulation will seek comparability with relevant national and local surveys.

The users will have similar numbers of nearby everyday destinations (e.g. supermarket), which allows to focus on the differences in the quality of their walking environments and public transport services.
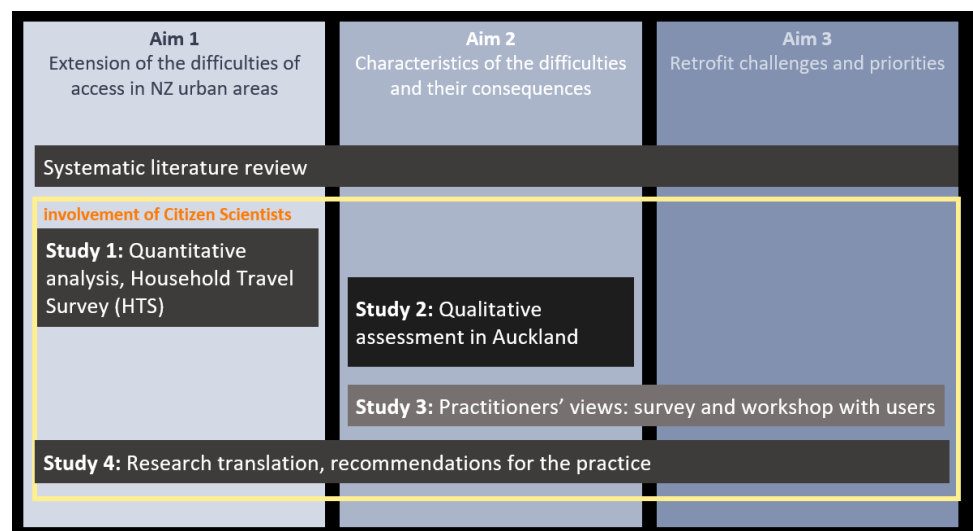
A qualitative analysis will examine what contributes to trips perceived as difficult or impossible, and how these correlate with the trip outcomes (trip walked, done by another mode, or foregone). A subset of participants will independently capture insights around the important aspects of the street environment, using a specialised app that collects photos, voice recordings, and trip routes. This subset of participants are the Citizen Scientists, a group that will be involved throughout the study, discussing the findings, suggesting further analysis needed, participating to a focus group with practitioners and empowered at the end of the study with specific insights that can be braught to local authorities.

Aim 3. Retrofit challenges and priorities
Local practitioners working in fields related to streets design and retrofit, public health, and support to people with impairments, will participate to an online survey that will identify perceived priorities of intervention and challenges. Results will be analysed thematically to identify agreements and disagreements between disciplines and correlation with the users' inputs. They will further be discussed within a focus group involving also the Citizen Scientists and seeking a better understanding of the possible disagreements.
A targeted feedback will be provided to the practitioners and authorities at the end of this study.

Dissemination

The planned outputs, to be published between April 2019 and July 2021, are: (1) four peer-reviewed journal publications (systematic literature review; quantitative analysis of HTS survey; perceptions of difficulties and deterrents and objective characteristics; multi-disciplinary views); (2) national and international conference presentations; (3) a summary for the participants; (4) a technical report for the involved practitioners and Auckland Council; and (5) a PhD thesis.

University approvals

The methodology proposed in this study has been approved by the Auckland University of Technology Ethics Committee on 7 December 2018 (ref. 18/431).
The project methodology and adequateness have successfully passed examination by two independent experts (report, and candidature confirmation exam on 15 November 2018), and approved by thethe Faculty Post Graduate and Research Committee on 11 December 2018.

Research Benefits

This study will provide insights for prioritising urgently needed accessibility improvements relating to local[25,27–29] and national[44] visions to encourage walking and allow people with disabilities to participate in everyday life in everyday places[18], as well as the requirements of the Convention on the Rights of Persons with Disabilities (CRPD)[3]. The importance and significance have been successfully tested with 21 representatives of users groups and professionals involved in key organisations and groups such as the Disability Data and Evidence Working Group, Auckland Council (Design Office, Diversity and Inclusion), Auckland Transport, NZ Transport Agency and the Office of Disability Issues, who has issued a support letter available under http://bit.ly/support-ODI).
The outcomes target acknowledged evidence gaps for leveraging walking/wheeling and participation within complex urban systems[39,49] and targeting retrofit within the urban areas' transformation[17,49–56].

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i   Auckland's Active Modes survey (Measuring and growing active modes of transport in Auckland, TRA/ Auckland Transport, May 2018) largely focuses on cycling (28 questions, vs 16 for walking). "Walking" doesn't include using a wheelchair and a respondent with "any disability or impairment [affecting their ability to walk]" is not asked about walking / wheeling behaviour and barriers.