

Measuring the built environment for active transport: A review

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Background

There is increasing recognition of the role the physical environment, particularly in urban areas, plays in influencing health behaviours such as physical activity.

A recent trend in the literature is investigating the effect of the environment on physical activity and in particular active transport behaviours such as walking and cycling. Consequently, three contrasting measures of the built environment have been developed, they are:

- (1) *Objective* – using Geographical Information Systems (GIS). Based on existing data sources, e.g census data
- (2) *Observational* – called Audit tools. Trained observers collect data, considering qualities and quantities of the environment, e.g quality of bicycle paths
- (3) *Perceived* – or self-reports are subjective and based on structured questionnaires or interviews

However, research to date has largely been limited to understanding the urban environment in terms of its walkability, which is just one form of active transport. Other aspects of transport infrastructure such as bikeability, public transport provision or ease of car use can impact physical activity levels and health outcomes. Therefore it is important to investigate the potential effects of different aspects of the built environment on these modes.

Aim

To review the literature on the measures used to assess the built environment for four different modes of transport

- Walking
- Cycling
- Public Transport use
- Car use

Method

A systematic search of the literature and references of pertinent papers was conducted. Health, transport and urban geography databases were searched using key words such as: Urban environment, physical activity, GIS, active transport, health, walkability, bikability, public transport, car, motorised vehicles.

Findings & Discussion

There is an abundance of studies and reviews on the built environment and its influence on walkability. Some studies created, using GIS, an index of Walkability to use in their analyses. The principle components of the index include:

- population density
- land-use mix
- street connectivity

Other aspects of the environment measured in the literature include access to recreational facilities or green space, traffic congestion, safety and crime, presence of pathways and cycleways, aesthetics, and topography.

Bikability is a relatively unexplored and new concept in the literature and is reflected in the limited number of studies that have created an index of bikeability. However, it is suggested, along with street connectivity, land-use mix and population density, that other factors can also influence route choice and the decision to bicycle.

- bike related infrastructure (bike paths, surface quality, car park)
- topography (hilliness)
- aesthetics (greenery)
- safety

Researchers are now beginning to further investigate the potential of and develop bikability indices. Similar to bikability, there is limited evidence in the literature of public transport and car based indices. Public transport indices are created in terms of accessibility and frequency. Research on private motor vehicles is mainly from the transport engineering discipline and focuses on issues of level of service, i.e performance of transportation network.

Conclusion

The main focus in the literature measuring the built environment has been largely limited to one form of active transport, walkability. This presents an opportunity to assess the environment in relation to other modes of transport (cycling, using public transport and car based transport) and the potential influences on physical activity.

Future Work

The next step in this research is to research and construct, using GIS, a robust set of indicators of walkability, bikability, public-transit-ability and car-ability for the main urban centres in New Zealand. These indices will be used for further analyses to assess for influences on health outcomes and time spent in active transport. This has the potential to add a more nuanced perspective on the aspects of the built environment that can influence health outcomes.

