Check the Score:
Field Validation of Street Smart Walk Score in Alberta, Canada

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Highlights

- Physical inactivity linked to chronic disease can be addressed by increasing walking
- Understanding walkability can support health promotion policies and interventions
- Walk Score® provides a uniquely accessible and generalizable metric for walkability
- Walk Score® has been validated in the urban United States but not internationally
- Walk Score® was validated in Alberta, Canada using field observation and correlation

Significance

Population levels of overweight and obesity are accelerating across Canada. In every community, increasing walking as a physical activity can help reverse this trend. However, there is a lack of common standards for measuring community walkability.

Walk Score® is a proprietary walkability metric which could potentially serve as a common standard, ranking locations by their proximity to destinations geocoded on the internet.[1]

Walk Score®	Description
90-100	**Walker's Paradise:** Daily errands do not require a car
70-89	**Very Walkable:** Most errands accomplishable on foot
50-69	**Somewhat Walkable:** Some errands accomplishable on foot
25-49	**Car-Dependent:** Most errands require a car
0-24	**Car-Dependent:** Almost all errands require a car

Currently, field validations of Walk Score® have only occurred in metropolitan regions of the United States.[2,3] Moreover, many studies employ an earlier Walk Score® version using straight line distance.

To address this gap, a field validation was completed for the newest, network-based Walk Score® for three municipal types along a rural-urban continuum in Alberta, Canada.

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Methods

As part of the Community Health and the Built Environment (CHBE) project, 2108 Walk Score® data points were reverse-engineered by approximating the internet-based algorithm with street-level systematic observations obtained in Bonnyville, Medicine Hat, and North Central Edmonton, all located in Alberta, Canada.

Walk Score = Raw Score / 15 x 6.67 – (ID + ABL)*
**ID = Intersection Density, ABL = Average Block Length*

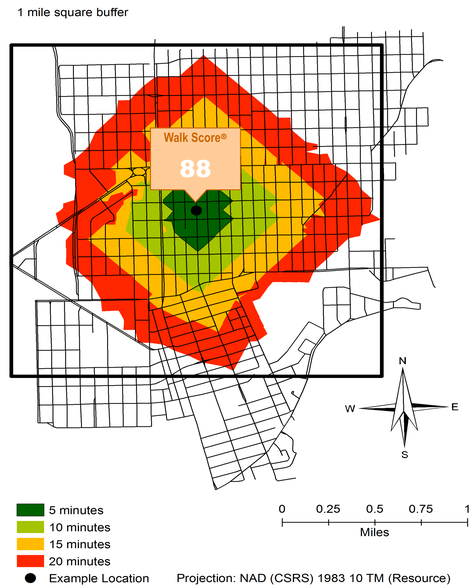
Raw Score:

Grocery Stores (3 pts)	**Banks** (1 pt)
Restaurants (3 pts)	**Schools** (1 pt)
Shopping (2 pts)	**Entertainment** (1 pt)
Coffee Shops (2 pts)	**Bookstores** (1 pt)
	Parks (1 pt)

All of the raw scores are tempered by a distance decay function that lowers scores based on a 5, 10, 15, or 20 minute walk from each location.[4]

The Walk Score® and street-level systematic observation data points were inputted into a Geographic Information System for geospatial analysis.[5]

Figure 1. Geospatial analysis area for a data point in North Central Edmonton



Applying the Clifford-Richardson adjustment for spatial autocorrelation,[6] Spearman's rank correlation coefficients (rho, r_s) and adjusted p-values were calculated to measure strength of association between the reverse-engineered scores and the original network-based data points provided by Walk Score® for each community.

Study Communities

Bonnyville had a "car-dependent" Walk Score® overall. Small population centres like Bonnyville (population 6200) typically have fewer destinations, longer block lengths, higher speed limits, less street lighting, and fewer sidewalks than in metropolitan regions.[7]

The challenge in using Walk Score® for health promotion in small population centres is that rural conceptions of walkability tend to place a greater value on recreational walking over active transportation.[8] Because Walk Score® is a destination-based metric, it may not capture many of the most important opportunities to increase walking in these municipal types.

Medicine Hat had a "car-dependent" Walk Score® overall. Medium population centres like Medicine Hat (population 60 000) are frequently dominated by a more proportionately suburban built environment of automobile-centric street networks and sprawling and separated land uses.[7]

The challenge in using Walk Score® for health promotion in medium population centres is that interventions to increase the density of destinations run against suburban land use ideology and practice. Suburban communities can be more easily retrofitted with infrastructure like foot paths, walking trails, and greenspaces that emphasize recreational versus transportation walking.[9]

North Central Edmonton had a "very walkable" Walk Score® overall. Large population centres like North Central Edmonton (population 41 000 within a larger population centre of 812 000) frequently comprise older, inner city neighborhoods with mixed land uses, gridded street networks, and high levels of pedestrian connectivity.[7]

The challenge in using Walk Score® for health promotion in large population centres is that destination-based metrics fail to grapple with socio-demographic factors such as ethnic and linguistic diversity, higher crime rates, higher residential transience, and lower median household income. Such factors tend to cluster in these areas, and change the walking profiles of residents.[10]

Results

Spearman's rho for the scores were very high for Bonnyville (r_s=0.950, adjusted p<0.001), and high for Medicine Hat (r_s=0.790, adjusted p<0.001) and North Central Edmonton (r_s=0.763, adjusted p<0.001).

Table 1. Mean Walk Scores® and Reverse-Engineered (CHBE) Scores in each community

	Walk Score®		CHBE Score		
	Mean	95% CI	Mean	95% CI	p-value
Bonnyville	40.8	(37.3, 44.3)	42.4	(39.1, 45.6)	0.003*
Medicine Hat	45.0	(43.5, 46.5)	39.3	(38.0, 40.6)	<0.001*
North Central Edmonton	76.6	(75.7, 77.5)	84.4	(83.3, 85.5)	<0.001*

Table 2. Measures of spatial autocorrelation and correlation in the data set

	Walk Score®		CHBE Score				
	Moran's *I*	p-value	Moran's *I*	p-value	Spearman's *r*	p-value	Adj. p-value
Bonnyville	0.355	0.000*	0.324	0.000*	0.950	0.000*	<0.001*
Medicine Hat	0.250	0.000*	0.279	0.000*	0.790	<0.001*	<0.001*
North Central Edmonton	0.208	0.000*	0.196	0.000*	0.763	0.000*	<0.001

Implications

Walk Score® has the potential to benefit walkability research as a common standard by providing a low-cost, easily accessible metric with a high degree of generalizability.

This field validation in Bonnyville, Medicine Hat, and North Central Edmonton (all located in Alberta) provides evidence that Walk Score® can be confidently applied along a rural-urban continuum in the western Canadian context.

However, from a health promotion perspective, critical assessment of Walk Score® and its suitability for different municipal types is needed to better leverage these demonstrated associations into appropriate community-based walkability policies and interventions.