Appendices

Appendix A: Search Strategy

Terms Searched

a. The term "built environment" was used in conjunction with design, land use, and transportation, as well as a separate, stand-alone term

b. Indicator and Index (Indices) was added to the search strong (with Boolean Operators AND, OR)

Databases Searched

To identify current white and grey literature discussing built environment indicators, the following databases were searched: JSTOR, Embase, PsycInfo, Academic Search Complete, Environment Complete, Urban Studies, Business Source Complete, ProQuest, MEDLINE, PubMed, Scopus, and Web of Science.

The databases were searched for 6 constructs: design, land use, transportation, indicator, health and built environment.

Search Strings:

1. (design* OR "land use" OR transport* OR zon*) AND (measure* OR performance OR outcome* OR assess* OR evaluat*) AND (health OR "health status") AND "built environment" AND (indicator* OR index OR indices)

2. (design* OR "land use" OR transport* OR zon*) AND (measure* OR performance OR outcome* OR assess* OR evaluat*) AND (health OR "health status") AND "built environment" AND indicator*

3. (measure* OR performance OR outcome* OR assess* OR evaluat*) AND (health OR "health status") AND "built environment" AND (indicator* OR index OR indices)

4. (measure* OR performance OR outcome* OR assess* OR evaluat*) AND (health OR "health status") AND "built environment" AND indicator*

Appendix B: Inclusion & Exclusion Criteria

Inclusion	Exclusion
o English language	o Non-English language
o Human or human relevant research	o Non-human research
o Articles published from 2002 forward	o Articles published prior to 2002
o Any population or sub-population	o Does NOT act upon the built environment or has no potential to influence the built environment
o Measures or addresses indicators of man-made physical forms and processes	o Produced by a non-reputable or questionable organization
o Relates to any of the six health areas of interest: - Physical Activity -Nutrition -UV Radiation -Mental Health -Injury Prevention -Environmental Hazards	o Relates to health domains outside of the six health domains identified; Or does not affect health whatsoever
o Affects of influences the following levels of health: -Community/Neighbourhood -Institutional/Organizational -Social/Public Policy	o Affects individual or interpersonal levels of health
o All study designs, including review articles	o Qualitative and Narrative studies (as they don't provide a measure)
o Research from the following areas: -North America -Western Europe -Australia -New Zealand -UK	o Research that has taken place outside of these countries

Alberta Health Services

Appendix C: Original AACODS checklist

AACODS		YES	NO	?
Authority	Identifying who is responsible for the intellectual content. **Individual author:** • Associated with a reputable organization? • Professional qualifications or considerable experience? • Produced/published other work (grey/black) in the field? • Recognized expert, identified in other sources? • Cited by others? (use Google Scholar as a quick check) • Higher degree student under "expert" supervision? **Organization or group:** • Is the organization reputable? (e.g. W.H.O) • Is the organization an authority in the field? **In all cases:** • Does the item have a detailed reference list or bibliography?			
Accuracy	• Does the item have a clearly stated aim or brief? • Is so, is this met? • Does it have a stated methodology? • If so, is it adhered to? • Has it been peer-reviewed? • Has it been edited by a reputable authority? • Supported by authoritative, documented references or credible sources? • Is it representative of work in the field? • If No, is it a valid counterbalance? • Is any data collection explicit and appropriate for the research? • If item is secondary material (e.g. a policy brief of a technical report) refer to the original. Is it an accurate, unbiased interpretation or analysis?			
Coverage	All items have parameters which define their content coverage. These limits might mean that a work refers to a particular population group, or that it excluded certain types of publication. A report could be designed to answer a particular question, or be based on statistics from a particular survey. • Are any limits clearly stated?			
Objectivity	It is important to identify bias, particularly if it is unstated or unacknowledged. • Opinion, expert or otherwise, is still opinion: is the author's standpoint clear? • Does the work seem to be balanced in presentation?			

Date	For the item to inform your research, it needs to have a date that confirms relevance • Does the item have a clearly stated date related to content? No easily discernible date is a strong concern. • If no date is given, but can be closely ascertained, is there a valid reason for its absence? • Check the bibliography: have key contemporary material been included?			
Significance	This is a value judgment of the item, in the context of the relevant research area. • Is the item meaningful? (this incorporates feasibility, utility and relevance) • Does it add context? • Does it enrich or add something unique to the research? • Does it strengthen or refute a current position? • Would the research area be lesser without it? • Is it integral, representative, typical? • Does it have impact? (in the sense of influencing the work or behaviours of others)			

Burls, A. 2009, *What is critical appraisal?*, Bandolier, viewed 4 November 2009.
http://www.medicine.ox.ac.uk/bandolier/painres/dpwnload/whatis/What is critical appraisal.pdf

Jess Tyndall,
Flinders University,
Nov 2010

Appendix D: Revised AACODS Checklist

AACODS		YES	NO	?
Authority (7)	Identifying who is responsible for the intellectual content. **Individual author:** • Professional qualifications or considerable experience? • Produced/published other work (grey/black) in the field? • Recognized expert, identified in other sources? • Higher degree student under "expert" supervision? **Organization or group:** • Is the organization reputable? (e.g. W.H.O) • Is the organization an authority in the field? **In all cases:** • Does the item have a detailed reference list or bibliography?			
Accuracy (7)	• Does the item have a clearly stated aim or brief? Is so, is this met? • Does it have a stated methodology? If so, is it adhered to? • Has it been peer-reviewed? • Supported by authoritative, documented references or credible sources? • Is it representative of work in the field? If No, is it a valid counterbalance? • Is any data collection explicit and appropriate for the research? • If item is secondary material (e.g. a policy brief of a technical report) refer to the original. Is it an accurate, unbiased interpretation or analysis?			
Objectivity (2)	It is important to identify bias, particularly if it is unstated or unacknowledged. • Opinion, expert or otherwise, is still opinion: is the author's standpoint clear? • Does the work seem to be balanced in presentation?			
Date (3)	For the item to inform your research, it needs to have a date that confirms relevance • Does the item have a clearly stated date related to content? No easily discernible date is a strong concern. • If no date is given, but can be closely ascertained, is there a valid reason for its absence? • Check the bibliography: have key contemporary material been included?			

Appendix E: Alberta Health Services Urban-Rural Continuum

Rural – Urban Continuum (Functional Areas)
Alberta Health Services & Alberta Health and Wellness

Rural – urban continuum functional areas are based on multiple characteristics

- population density
- distance from urban centres
- local knowledge of populations, industry type, municipalities, resources, infrastructure
- alignment with AHS/AH Local Geographic Areas

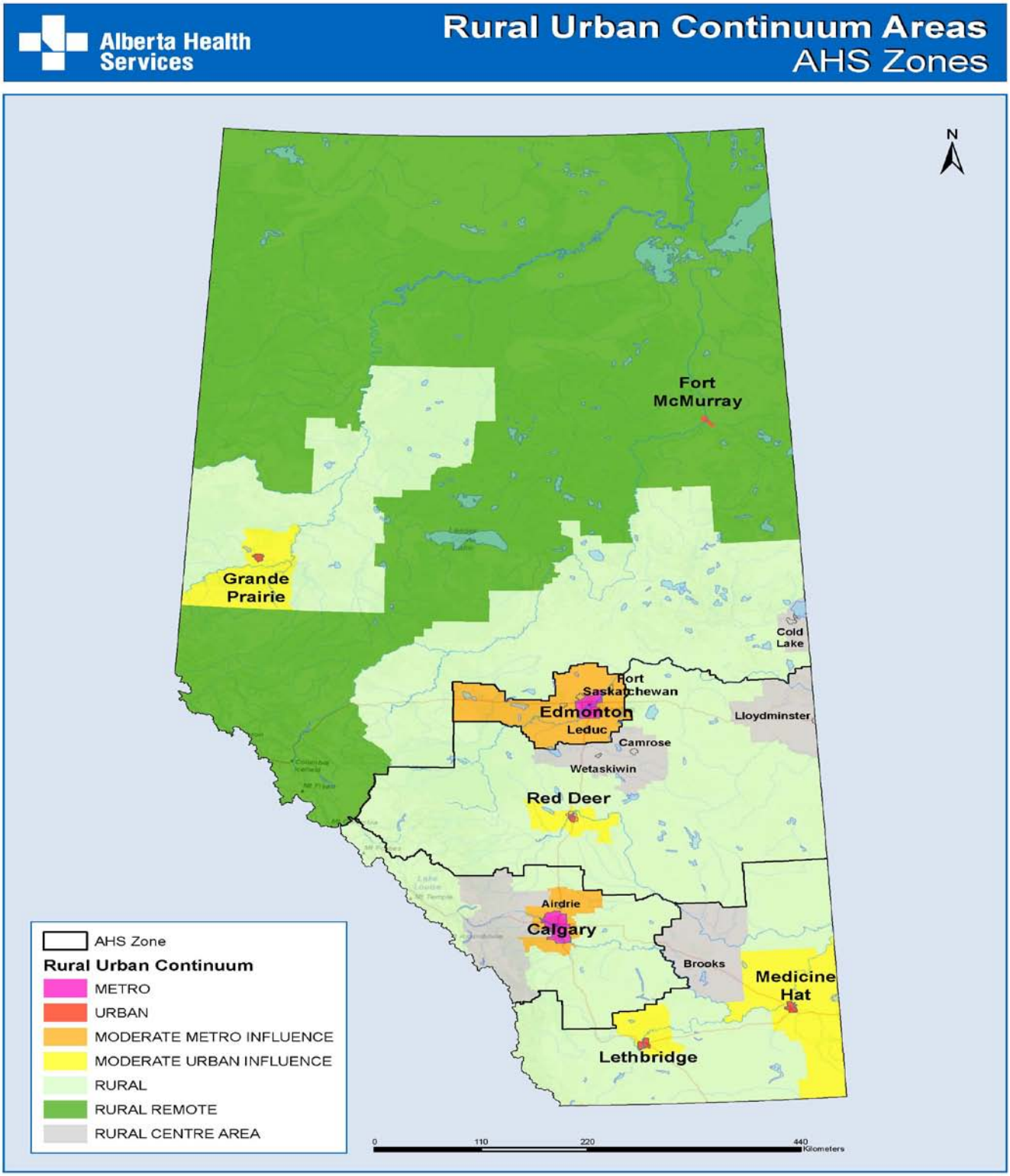
Rural-urban continuum is divided into 7 distinct areas;

1. Metro centres – population >500,000. Calgary and Edmonton proper.
2. Metro influenced area - defined by AHS Local Geography areas immediately surrounding Calgary and Edmonton. These are deemed as commuter communities (live outside of Calgary/Edmonton but commute to Calgary/ Edmonton for work and business).
   Calgary metro influenced area includes the towns of:
   - Cochrane
   - Airdrie
   - Okotoks
   - Priddis
   - Chestermere Lake
   - Springbank area

   Edmonton metro influenced area includes the towns of:
   - St Albert
   - Fort Saskatchewan
   - Stony Plain & Spruce Grove
   - Sherwood Park
   - Leduc
3. Urban - 5 major urban centres with populations > 25,000 but less and 500,000 (Grand Prairie, Fort McMurray, Red Deer, Lethbridge, Medicine Hat) .
4. Moderate Urban Influenced – Local Geographic areas surrounding the 5 urban centres. These areas are typically considered rural given that their populations are low and the Local Geographic areas do not define these areas properly (refer to note below).
5. Large Rural Centres and Surrounding Areas – 10,000 to less than 25,000 population (Brooks, Canmore, Wetaskiwin, Camrose, Lloydminster, Cold Lake). These areas are considered rural but are defined for the purpose of special studies. All 5 areas have unique populations and industries but belong to the rural area.
6. Rural Areas – populations less than 10,000 and up to 200 kilometres from a Metro or Urban centre. These include towns, villages, hamlets, and agricultural areas.
7. Remote – greater than 200 kilometres from a Metro or Urban centre. Industries tend to include oil & gas, forestry, hunting/trapping, tourism and sometimes pockets of agriculture.

Notes: The areas surrounding all major cities (moderate urban influence), excluding Calgary and Edmonton, are too small at this time to separate from the surrounding rural areas. Hence these areas are considered rural for the purpose of analysis.

Alberta Health Services



Appendix F: Reliability and Validity Appraisal

<table>
<tr><th>Item</th><th>Explanation</th></tr>
<tr><td>Face Validity (2)
Appraiser
Yes=1
No=0

Author
Yes=1
No=0</td><td>Face Validity refers to whether the indicator measures what it states or intends to measure

<u>1 point from author</u> if the document reports that face validity of this indicator has been established in the field, or as a construct or theory.

**If the document is believed to have NO face validity by both appraiser and expert, it does not move on for further methodological evaluation.</td></tr>
<tr><td>Construct Validity
Yes=1
No/Not Reported=0</td><td>Validity refers to if a scale/indicator is measuring what we think it is.

Construct validity assesses the theory and the measure at the same time, to understand whether the measure of the variable actually reflects its true theoretical concept.
-Factor analysis (similar items on a scale will vary together, create factors that correspond to different dimensions in a scale)
-Convergent/Divergent (correlation with other known instruments, measures)
-Discriminant (tests of differences with known groups)</td></tr>
<tr><td>Criterion Validity
Yes=1
No/Not Reported=0</td><td>Criterion validity refers to the correlation of a scale/indicator with some other measure of the behaviour under study, ideally, a ‘gold’ standard which has been used and accepted in the field
-Predictive (future performance predicted from previous measure)
-Concurrent</td></tr>
<tr><td>Test-Retest Reliability
Yes=1
No/Not Reported=0</td><td>Reliability refers to how reproducible the results of a scale are under different conditions.

Test-retest reliability refers to the variation in measurements taken by a single person or instrument on the same item and under the same conditions.
Tests: Pearson correlation, Bland Altman, Analysis of variance</td></tr>
<tr><td>Internal Consistency Reliability
Yes=1
No/Not Reported=0</td><td>Internal Consistency refers to a measure based on the correlations between different items on the same test (or the same subscale on a larger test). It measures whether several items that propose to measure the same general construct produce similar scores

*Receive one point if indicator receives .7 or higher on Cronbach’s alpha
<table>
<tr><th>Cronbach's alpha</th><th>Internal consistency</th></tr>
<tr><td>$\alpha \geq .9$</td><td>Excellent</td></tr>
<tr><td>$.9 > \alpha \geq .8$</td><td>Good</td></tr>
<tr><td>$.8 > \alpha \geq .7$</td><td>Acceptable</td></tr>
</table>
</td></tr>
</table>

Appendix G: Feasibility Appraisal

ITEM	EXPLANATION
Usefulness in policy, social or organization context? (2 pts)	2 points if the indicator is already in place 1 point if indicator isn't in place, but would be useful in implementing 0 points if it hasn't been implemented and is deemed not useful to implement
Was the indicator tested/evaluated in similar setting characteristics to Alberta? (metro, urban, rural, etc) (2 pts)	2 points if the indicator is applicable to more than one setting 1 point if the indicator is applicable to one setting 0 points if the indicator is not applicable to any setting
Strong focus or applicability on reducing health inequities? (2 pts)	2 points if the indicator *clearly* unmasks inequalities in society and/or sub-populations 1 point if the indicator *partially* unmasks inequalities in society and/or sub-populations 0 points if the indicator does not unmask inequalities in society and/or sub-populations whatsoever

Appendix H- Full Text Studies Reviewed

Very Promising Indices

1. Brown,SC, Mason CA, Perrino T, Lombard JL, Martinez F, Plater-Zyberk E, Spokane AR, Szapocznik, J. Built environment and Physical Functioning in Hispanic Elders: The Role of "Eyes on the Street". Environmental Health Perspectives. 2008;116(10):1300-1307
2. Frank LD, Andresen, MA, Schmid, TL. Obesity Relationships with Community Design, Physical Activity, and Time Spent in Cars. American Journal of Preventive Medicine. 2004;27(2):87-96
3. Koohsari, M. J. (2011). Access to public open space: Is distribution equitable across different socio-economic areas. Journal of Urban and Environmental Engineering, 5(2), 67-72.
4. Lovasi GS, Moudon AV, Pearson AL, Hurvitz PM, Larson EB, Siscovick DS, Berke EM, Lumley T, Psaty BM. Using built environment characteristics to predict walking for exercise. International Journal of Health Geographics. 2008;7(10)
5. Seliske LM. The Built Environment and Obesity-Related Behaviours in Canadian Youth. PhD Dissertation: Community Health & Epidemiology Program; Queen's University, Kingston, Ontario. 2012
6. Shay E, Rodriguez DA, Cho G, Clifton KJ, Evenson KR. Comparing Objective Measures of Environmental Supports for Pedestrian Travel in Adults. International Journal of Health Geographics. 2009;8(62)

Promising Indices

1. Alfonzo MA, Boarnet MG, Day K, McMillan T, Anderson CL. The Relationship of Neighbourhood Built Environment Features and Adult Parents' Walking. Journal of Urban Design. 2008;13(1):29-51.
2. Apparicio P, Cloutier, MS, Shearmur R. The Case of Montreal's Missing Food Deserts- Evaluation of Accessibility to Food Supermarkets. International Journal of Health Geographics. 2007;6(4)
3. Athens J, Bekkedal M, Malecki K, Anderson H, Remington PL. (2008). Measuring the Environmental Health of Wisconsin's Counties. Wisconsin Medical Journal. 2008;107(4):169-175.
4. Bader, MDM, Purciel M, Yousefzadeh P, Neckerman KM. Disparities in Neighborhood Food Environments: Implications of Measurement Strategies. Economic Geography. 2010; 86(4):409-430
5. Bjork J, Albin M, Grahn P, Jacobsson H, Ardo J, Wadbro J, Ostergren PO, Skarback E. Recreational Values of the Natural Environment in Relation to Neighbourhood Satisfaction, Physical Activity, Obesity and Wellbeing. Journal of Epidemiology and Community Health. 2008;62(4):e2
6. Chen S., Florax RJGM, Snyder S, Miller CC. Obesity and Access to Chain Grocers. Economic Geography. 2010;86(4); 431-452
7. Clarke P, George LK. The role of the Built Environment in the Disablement Process. American Journal of Public Health. 2005;95(11):1933-1939
8. Cohen DA, Scott Ashwood J, Scott MM, Overton A, Evenson KR, Staten LK, Porter D, McKensie TL, Catellier D. Public Parks and Physical Activity Among Adolescent Girls. Journal of the American Academy of Pediatrics. 2006;118(5):1381-1389
9. Curran A, Grant J, Wood ME. Indicators for Community Action: Built Environment and Community Health. Journal of Rural and Community Development.2006;*46*(2):59-74
10. Duncan, D T, Aldstadt J, Whalen J, Melly SJ, Gortmaker S L. Validation of Walk Score (R) for Estimating Neighborhood Walkability: An Analysis of Four US Metropolitan Areas. International Journal of Environmental Research and Public Health. 2011;8(11):4160-4179

11. Epstein LH, Raja S, Gold SS, Paluch R A, Pak Y, Roemmich JN. Reducing Sedentary Behaviour: The Relationship between Park Area and the Physical Activity of Youth. Psychological Science. 2006;17(8):654-659
12. Frank L, Sallis J, Conway T, Chapman J, Saelens B. Many Pathways from Land Use to Health: Associations between Neighbourhood Walkability and Active Transportation, Body Mass Index and Air Quality. Journal of the American Planning Association. 2006;72(1):75-87
13. Frank LD, Schmid TL, Sallis JF, Chapman J, Saelens BE. Linking Objectively Measured Physical Activity with Objectively Measured Urban Form: Findings from SMARTRAQ. American Journal of Preventive Medicine.2005;28(2):117-125
14. Frank LD, Winters M, Patterson B, Craig CL. 2009. Promoting Physical Activity Through Healthy Community Design. Vancouver, B.C.: UBC Active Transportation Collaboratory
15. Hoehner CM, Ramirez LKB, Elliott MB, Handy SL, Brownson RC. Perceived and Objective Environmental Measures and Physical Activity among Urban Adults. American Journal of Preventive Medicine.2005; 28(2):105-16
16. Joshu CE, Boehmer TK, Brownson RC, Ewing R. Personal, Neighbourhood and Urban Factors Associated with Obesity in the United States. Journal of Epidemiology and Community Health.2008;62(3):202-208
17. Larsen K, Gilliland J. Mapping the Evolution of "Food Deserts" in a Canadian City: Supermarket Accessibility in London, Ontario, 1961–2005. International Journal of Health Geographics. 2008;7(16)
18. Loukaitou-Sideris A,Stieglitz O. Children in Los Angeles Parks: A Study of Equity, Quality and Children's Satisfaction with Neighbourhood Parks. The Town Planning Review. 2002;73(4); 467-488
19. Marshall JD, Brauer M, Frank LD. Healthy Neighbourhoods: Walkability and Air Pollution. Environmental Health Perspectives. 2009; 117(11);1752-1759.
20. Morland K, Filomena S. Disparities in the Availability of Fruits and Vegetables between Racially Segregated Urban Neighbourhoods. Public Health Nutrition. 2007; 10:1481–9.
21. Neckerman KM, Lovasi GS, Davies S, Purciel M, Quinn J, Feder E, Raghunath N, Wasserman B, Rundle, A. Disparities in Urban Neighborhood Conditions: Evidence from GIS Measures and Field Observation in New York City. Journal of Public Health Policy. 2009;30:S264-S285
22. Sallis JF, Kerr J, Carlson JA, Norman GJ, Saelens BE, Durant N, Ainsworth BE. Evaluating a Brief Self-Report Measure of Neighborhood Environments for Physical Activity Research and Surveillance: Physical Activity Neighborhood Environment Scale (PANES). Journal of Physical Activity & Health. 2010;7(4):533-540.
23. Smiley, M. (2011). *Health-related characteristics of American urban environments: Description, measurement, and associations with healthy behaviours.* (Ph.D., University of Michigan). , 111.
24. Smith KR, Brown BB, Yamada I, Kowaleski-Jones L, Zick CD, Fan JX. Walkability and Body Mass Index - Density, Design, and New Diversity Measures. American Journal of Preventive Medicine. 2008; 35(3):237-244
25. Spruzjt-Metz D, Wolch J, Jerrett M, Byrne J, Hsieh S, Myles R, Xie B, Wang L, Chou C-P, Reynolds KD. Development, Reliability, and Validity of an Urban Trail Use Survey. American Journal of Health Promotion. 2010;25(1):2-11
26. Sundquist K, Eriksson U, Kawakami N, Skog L, Ohlsson H, Arvidsson D. Neighborhood Walkability, Physical Activity, and Walking Behaviour: The Swedish Neighborhood and Physical Activity (SNAP) Study. Social Science and Medicine. 2011;72(8):1266-1273
27. Tomalty R, Haider M. BC Sprawl Report: Walkability and Health. City of Vancouver, City of Port Moody and District of Invermere. 2009.
28. Weiss CC, Purciel M, Bader M, Quinn JW, Lovasi G, Neckerman KM, Rundle AG. Reconsidering Access: Park Facilities and Neighborhood Disamenities in New York City. Journal of Urban Health. 2011;88(2):297-310

29. Witten K, Pearce J, Day P. Neighbourhood Destination Accessibility Index: A GIS Tool for Measuring Infrastructure Support for Neighbourhood Physical Activity. Environment and Planning- Part A. 2011; 43(1):205-223

30. Wolch J, Jerrett M, Reynolds K, McConnell R, Chang R, Dahmann, N, Berhane, K. Childhood Obesity and Proximity to Urban Parks and Recreational Resources: A Longitudinal Cohort Study. Health & Place. 2011;17(1):207-214

Less Promising Indices

1. Apparicio P, Seguin A, Naud D. The Quality of the Urban Environment around Public Housing Buildings in Montreal: An Objective Approach based on GIS and Multivariate Statistical Analysis. Social Indicators Research. 2008;86(3):355-380.

2. Berke EM, Gottlieb LM, Vernez Moudon A, Larson EB. Protective Association Between Neighborhood Walkability and Depression in Older Men. Journal of the American Geriatrics Society. 2007;55(4):526-533.

3. Bernstein KT, Galea S, Ahern J, Tracy M, Vlahov D. The Built Environment and Alcohol Consumption in Urban Neighbourhoods. Drug and Alcohol Dependence. 2007;91:244-252

4. Besser LM, Dannenberg, AL. Walking to Public Transit: Steps to Help Meet Physical Activity Recommendations. American Journal of Preventive Medicine. 2005;29(4):273-280

5. Boardman JD, Downey L, Jackson JS, Merrill JB, Saint JM, Williams DR. Proximate Industrial Activity and Psychological Distress. Population and Environment. 2008;30(1):3-25

6. de Sa, E. (2011). *Associations between leisure-time and transport-related physical activity with objective measures of the built environment.* (M.Sc., York University (Canada)). , 94.

7. Forsyth A, Schmitz K, Hearst MO, Oakes JM. Design and Destinations: Factors Influencing Walking and Total Physical Activity. Urban Studies. 2008;45(9):1973-1996

8. Freedman VA, Grafova IB, Schoeni RF, Rogowski J. (2008). Neighbourhoods and Disability in Later Life. Social Science and Medicine. 2008;66(11):2253-2267.

9. Gauvin L, Riva M, Barnet T, Richard L, Craig C.L, Spivock M, Laforest S, Laberge S, Fournel M.C., Gagnon H, Gagné S. Association between Neighborhood Active Living Potential and Walking. American Journal of Epidemiology. 2008;167(8):944-953

10. Handy S, Cao X, Mokhtarian PL. Self-Selection in the Relationship between the Built Environment and Walking. Journal of the American Planning Association. 2006;72(1):55-74

11. Johnson GD, Lu X. Neighborhood-Level Built Environment and Social Characteristics Associated with Serious Childhood Motor Vehicle Occupant Injuries. Health & Place. 201;17(4):902-910

12. Kim S, Adamson KC, Balfanz DR, Brownson R C, Wiecha JL, Shepard D, Alles WF. Development of the Community Healthy Living Index: A Tool to foster Healthy Environments for the Prevention of Obesity and Chronic Disease. American Journal of Preventive Medicine. 2010; 50: S80-S85.

13. Lachapelle U, Frank L, Saelens BE, Sallis JF, and Conway TL. Commuting by Public Transit and Physical Activity: Where You Live, Where You Work, and How You Get There. Journal of Physical Activity and Health. 2011; 8 (1):72-82

14. Li F, Fisher KJ, Brownson RC, Bosworth M. Multilevel Modelling of Built Environment Characteristics related to Neighbourhood Walking Activity in Older Adults. Journal of Epidemiology and Community Health. 2005;59:558-564

15. Lovasi G, Jacobson J, Quinn J, Neckerman K, Ashby-Thompson M, Rundle A. Is the Environment near Home and School associated with Physical Activity and Adiposity of Urban Preschool Children? Journal of Urban Health. 2011;88(6):1143-1157

16. Maas J, Verheij RA, Groenewegen PP, Vries, SD, Spreeuwenberg P. Green Space, Urbanity, and Health: How Strong is the Relation? Journal of Epidemiology and Community Health. 2006; 60(7), 587-592

17. Morello-Frosch R, Jesdale BM. Separate and Unequal: Residential Segregation and Estimated Cancer Risks Associated with Ambient Air Toxics in U.S. Metropolitan Areas. Environmental Health Perspectives. 2006;114(3):386-393

18. Norton JM, Wing S, Lipscomb HJ, Kaufman JS, Marshall SW, Cravey A J. Race, Wealth, and Solid Waste facilities in North Carolina. Environmental Health Perspectives. 2007; 115(9):1344-1350

19. Oliver LN, Schuurman N, Hall AW. Comparing Circular and Network Buffers to Examine the Influence of Land Use on Walking for Leisure and Errands. International Journal of Health Geography. 2007;6(41):1-11

20. Owen N, De Bourdeaudhuij I, Sugiyama T, Leslie E, Cerin E, Van Dyck D, Bauman A. Bicycle Use for Transport in an Australian and a Belgian city: Associations with Built Environment Attributes. Journal of Urban Health: Bulletin of the New York Academy of Medicine. 2010;87(2):189-198

21. Purciel M, Neckerman KM, Lovasi GS, Quinn JW, Weiss C, Bader MDM, Ewing R, Rundle, A. Creating and Validating GIS Measures of Urban Design for Health Research. Journal of Environmental Psychology. 2009;29(4):457-466.

22. Riva M, Gauvin L, Apparicio P, Brodeur J. Disentangling the Relative Influence of Built and Socioeconomic Environments on Walking: The Contribution of Areas Homogenous Along Exposures of Interest. Social Science and Medicine. 2009;69(9):1296-1305

23. Rundle A, Diez Roux AV, Freeman LM, Miller, D, Neckerman K, Weiss CC. The Urban Built Environment and Obesity in New York City: A Multilevel Analysis. American Journal of Health Promotion. 2007;21:326-334

24. Rundle A, Neckerman KM, Freeman L, Lovasi GS, Purciel M, Quinn J, Richards C, Sircar N, Weiss, C. (2009). Neighborhood Food Environment and Walkability predict Obesity in New York City. Environmental Health Perspectives.2008;117(3):442-447.

25. Park S. Defining, Measuring, and Evaluating Path Walkability, and Testing Its Impacts on Transit Users' Mode Choice and Walking Distance to the Station. PhD Dissertation: University of California, Berkeley. 2008.

26. Prince SA, Kristjansson EA, Russell K, Billett J-M, Sawada M, Ali A, Tremblay MS, Prud'homme D. A multilevel analysis of neighbourhood built and social environments and adult self-reported physical activity and body mass index in Ottawa, Canada. International Journal of Environmental Research and Public Health. 2011;8(10):3953-3978

Least Promising Indices

1. Hoehner CM, Handy SL, Yan Y, Blair SN, Berrigan D. Association between Neighborhood Walkability, Cardio-Respiratory Fitness and Body-Mass Index. Social Science and Medicine. 2011;73(12):1707-1716.

2. Konikov-Titievsky, L. Neighborhood walkability and body mass index in New York City. (Ph.D., Columbia University). 2010.

3. Krizek LJ, Johnson PJ. Proximity to Trails and Retail: Effects on Urban Cycling and Walking. Journal of the American Planning Association. 2006;72(1):34-42

4. Learnihan V, Van Neil KP, Giles-Corti B, Knuiman M. Effect of Scale on the Links between Walking and Urban Design. Geographical Research. 2011;49(2):183-191.

5. Maghelal, P. (2007). Healthy Transportation, Healthy Communities: Developing Objective Measures of Built Environment using GIS and Testing Significance of Pedestrian Variables on Walking to Transit. (Ph.D., Texas A&M University). , 129.

6. Mobley LR, Kuo T, Clayton LJ, Evans WD. Mammography Facilities are Accessible, so why is Utilization so low? Cancer Causes & Control. 2009;20(6):1017-1028.

7. Sugiyama T, Leslie E, Giles-Corti B, Owen N. Associations of Neighbourhood Greenness with Physical and Mental Health: Do Walking, Social Coherence and Local Social Interaction Explain the Relationships? Journal of Epidemiology and Community Health. 2008;62(9):e9

Appendix J: Summary of Interviews from Canadian Health Jurisdictions

Interviewees: Interviewees are organized by the province and organization that they were employed with at the time of this interview. No names or titles have been included as these interviews were only meant to provide a brief context of other provinces work in the Built Environment and to help uncover documents of relevance that our search strategy may have missed.

Legend of Interviewees

BRITISH COLOMBIA

1. Provincial Health Services Authority

SASKATCHEWAN

1. Saskatoon Health Region
2. University of Saskatchewan

ONTARIO

1. Toronto Public Health
2. Region of Peel
3. PHAC Ontario Office

Questions for Canadian Health Jurisdictions

1. Has your region been involved in activities aimed at influencing land-use, transportation, or building design with a view towards improving population health, including greater health equity?

1. Provincial network has created BC Health Built Environment Alliance. Various different sectors are a part of this:

- Parks & Recreation
- Municipalities
- Architects
- Transportation
- Academia
- Etc.

Purpose of this is to influence land design, educate planners on health; get involved in how community planning takes place.

1. As a researcher, there are partnerships with municipal planners and the health region. These stakeholders worked together on Walkable and Bikeable Saskatoon.

2. New to Sask. Health Region as of September 2012. They are involved in these types of activities to the best of her knowledge.

- Initiative called Safe Communities looks at municipal planning and building design from a Public Health perspective (a combination of environmental health and health inspection).

1. Yes.

a. Planning Department: Health must comment on every development proposal that is put forth (this is now mandated). Look at things like expansion, health and environmental impact.
b. Policy planning works with health. There are now 2 or 3 policies that include 'health language' and local municipalities have followed suit.
c. There are indicators to measure the level of change to help them understand land use elements

2. Within the Toronto Public Health Standards (revised in 2008), protocols and standards were rewritten to include built environment in the areas of environmental health and chronic disease.

- CLASP funded project
- Worked with Larry Frank to create a health impact assessment specifically for Toronto.
  - Health and planning data
  - City wide GIS (walkability map)
  - Mapping of parks, green spaces and density
- Residential permits survey with Larry Frank
  - Look at neighbourhood design features
  - Done for GTA and Vancouver

3. PHAC regional office- not within mandate or jurisdiction to influence land use, etc.

- In larger agency, BE is a priority. Specific projects on age-appropriate communities; generate evidence for land use policy, etc

2. If the answer to Question 1. is "yes," has the development or use of indicators of the built environment played a role in these activities? [If the answer is no, the interviewee could be asked to explain why not; they might have plans or intentions to develop or use BE indicators in the future, etc.]

1. Isn't entirely sure, as this was before this person's time at the organization. However, the Alliance identified certain priorities and are doing further refinement of these BE indicators. They specifically wanted to look at health impacts and the various measures and indicators that affect health.

1. Certain criteria has been chosen to start determining indicators (population density, food deserts)

2. Municipal planners have used stats and indicators from Smart Cities, Healthy Kids when developing new neighbourhoods, retrofitting roads, etc.
    - Used indicators/stats about aesthetics, destinations, safety, density, etc.

1. Yes. This exists through the tool the Healthy Development Index- chose areas of land use planning most related to health (focus on obesity and physical activity).

2. Yes.
    - Planning department- hold roundtable every 5 years to renew official plans
    - Provincial Policy Statement through municipal affairs and housing now has added a health perspective
    - Creation of a software tool (HIA) where indicators are embedded
    - Secondary plans look at BE indicators that have been commented on when there's a contentious issue
    - Looked at indicators around active transportation, equity and transit, vertical poverty
    - Planning a Healthier Toronto brings health and planners together

3. Shift from a PHAC perspective to an Association of Public Health Epidemiologists of Ontario (APHEO) perspective.
    - This group has recognized the importance of BE indicators
        - Committed to providing man power
        - Indicators have been developed by stakeholders and those implementing them; a very multidisciplinary group

3. If the answer to Question 2. Is "yes," what indicators have been developed or used? Can you provide some details about their use?

1. Please see report: http://www.phsa.ca/NR/rdonlyres/BF1C056B-4890-4A6D-BD7F D26E00C14826/0/IndicatorsforaHealthyBuiltEnvironmentinBC.pdf

1. N/A
2. Have developed indicators on aesthetics, destinations and travel, safety and density

1. The Healthy Development index looks at 7 land use elements (research was strongest in these areas). Based on these elements, they outline specific measurable indicators (e.g. street connectivity, intersection density, etc.)

2. Answers provided in question 2

3. APHEO looked at literature to build gold standard indicators. They will also be looking at a connectivity and road network indicator in the future. The following 3 indicators have been developed:
   - Job density
   - Land use mix
   - Population density

Alberta Health Services

4. How were the BE indicators that you developed or used chosen?

1. Not able to respond

1. N/A

2. Indicators were chosen/developed based on:
   - BE Characteristics that were frequently used in literature; shown to have association to physical and behavioral health outcomes
   - Measured using tools that were general (observational, degree of subjectivity); used Neighbourhood Active Living Tool developed in Montreal (added an accessibility measure to this tool).
   - Measured using tools that complemented general measure with a more objective measure (audit-based- used the Minnesota-Irvine tool).

1. The indicators that were developed or chosen were based on strength of evidence. They looked at various sectors, aesthetics and human scale.

2. Answers provided in question 2

3. Policy/Procedures and data sources were reviewed by planners to get another lens (this had a large impact).
   - Also used LEED Certification as guidelines- specifically looking at design, diversity and density

5. What challenges have you encountered in your development and/or your use of BE indicators? How did you deal with these challenges?

1. Not able to respond

1. This person wrote their thesis on Built Environment Indicators. She encountered the following challenges:
   - Limited tools available to measure built environment
   - Subjective and dependent on demographic (adults, children, seniors)
   - Also objective in certain instances; however, there are no tools currently validated for children
   - Built environment is related to more than just physical activity (she specifically looked at injury prevention, and there were not many tools for this area)

2. The challenges that they've experienced are ongoing. This person has noticed the following challenges through their work/research:
   - Built environment is still not well understood, so many are unfamiliar with terms/jargon
   - Giving good examples (good vs. bad built environment) isn't always easy; however pictures are often more effective than words
   - Engaging/maintaining/sustaining intersectoral partnerships can be challenging (limited terms, changing positions); however you can't make changes at the policy level without this.

1. This person indicated the challenges below:
   - The identification of indicators may not always be the way that information is collected
   - Lack of data availability
   - Lack of consistency with data collection/storage
     - A lot of research from HDI is based on urban-suburban transect but many are only suitable for urban environments
     - Once standards are in place, pre-existing barriers, such as engineering standards, present themselves

2. Data availability was a problem; only certain indicators were included in the formation of the HIA software

3. Challenges have revolved around lack of data sources. The lack of ability to change zoning has also been a challenge.

6. What do you believe has been the value of reporting or otherwise using your BE indicators? Have there been any negative or unforeseen consequences?

1. The value of reporting for the purpose of the Alliance, is that it provides a starting point; shows what data is currently available; make evident where the gaps exist;

   *Pilot Communities were represented on the Alliance

1. The value of reporting in Saskatoon has been that data can sometimes uncover health inequities and having validated indicators are very useful for future work, especially for mapping ideas (providing a visual aid to improve understanding and importance of issue)

2. Through his work, this person has noted its value through:
   - The ability to demonstrate that research is practical, application and has the ability to change policy
   - Saskatoon is a growing city- the timeliness of research is very good
     - For this first phase of research, the city led public engagement sessions to create a 30yr plan and they engaged researchers in this process, and allowed the researchers to say what issues they will be able to provide evidence on.

1. They have created value by bring planning and health to the same table. Both are respected and both are interested in strong targets and indicators.

2. The value of reporting or using indicators has been apparent in mapping and software.

3. When reporting begins, it will be beneficial to communities. Currently, PHAC provides evidence to start influencing planners and developers.

7. Are there BE indicators that you would like to develop or use, but which are out of reach right now because of data unavailability, cost constraints, or other reasons?

1. Not able to respond

1. This person has noticed the following constraints
   - Certain tools have not been validated for specific groups

2. Yes. This person would like to see better measures of connectivity for pedestrians and cyclists; a good measure of public transit use (connectivity of transit as well); and a better measure of seasonality (which he is working on right now). This person would also like to see better (any) measures of rural/remote built environment (did have some interest in these measures from the city public engagement)

1. This person expressed desire to further develop information around aesthetics and human scale, as these are a good balance between qualitative and quantitative information. This is now a priority for the region as they are funded by Healthy Canada by Design for two years (municipalities are on board). They are also interested in doing a cost-benefit analysis of the HDI to understand certain things like whether developers profit from the tool, etc.

2. Happy with our current suite, as we are working with a very urban population.

3. Certain data isn't freely available, so there are certain cost constraints
   - There are inequalities that exist between resource intense and resource poor health units in Ontario.

8. Any final thoughts on the development and use of BE indicators in your jurisdiction, especially as they relate to the BE initiatives that you have been or are currently involved with?

1. Not able to respond

1. This person is interested in further exploring health equity and community engagement indicators as they relate to the built environment
2. Already described in previous answers

1. It would be useful to consider an indicator that looks at air quality and built environment.
2. No
3. PHAC's perspective is based around collaboration and connection.
    - Focus on learning from each other
    - APHEO's BE Core Indicators have been able to make different connections by bringing together a diverse group of stakeholders to form the sub-group.

9. Are there political/administrative arrangements that facilitate work (including the development and use of BE indicators) on BE initiatives within this health jurisdiction? If so, how are these political/administrative arrangements advantageous?

1. The formation of the Alliance has been very helpful. It has really helped to facilitate collaboration around BE initiatives. The current chair is also the person who is leading the Healthy Community work, so that link is helpful. The Alliance began quite informally as various stakeholders with a common goal.

1. The Building Health Equity Program seconded a public health inspector from Safe Communities to work on their project. Saskatchewan has a regional intersectoral Committee (with provincial funding) that meets every other month. Key service providers sit on this Committee (school board, police, health region, etc.).

2. Yes. Saskatoon Health Region and Municipality are willing to work with researchers to incorporate evidence, ideas, etc.

1. The political/administrative arrangements in Ontario are very salient for their success. They have a two tiered system. Public Health only exists at the regional levels, so they are able to talk with municipalities to find out where they can provide assistance. However, planning is missing at the local level, as they don't have much influence.

2. Ontario Public Health (OPH) has a mandate to do this work

- Healthy Toronto by Design: Revival of healthy cities

3. Ontario PHAC has a BE Subgroup who developed a course called Health and Planning 101. This course was meant to inform and rectify differences between the knowledge, attitudes and beliefs of planners and public health practitioners

10. Are there any documents, internal or external, which you believe might be helpful or useful to our current work with built environment indicators?

1. Indicators for a Healthy Built Environment in BC

2. Saskatoon Food Mapping
   - Review of Built Environment Indicators, by Brownson, 2009
   - NCCEH just release urban traffic calming and road safety report

1. LEED documentation
2. St. Michael's hospital Inner City Health Report
3. APHEO BE Core Indicators