FACT SHEET: Supporting Health Equity Through the Built Environment

Environmental Health Services
BC Centre for Disease Control

This document was produced under the guidance of the Healthy Built Environment Linkages Toolkit Working Group.

INTRODUCTION

This Fact Sheet offers evidence-informed principles to support health equity through interventions in the built environment. It is based on a scoping review titled Working with local governments to support health equity through the built environment,[1] which examines 16 review articles and 37 Canadian empirical studies published on health equity and the built environment since 2010, and is supplemented with additional literature related to local government intervention options. Much of the research cited here explores health equity through measures of socioeconomic deprivation—there is limited research on the specific built environment needs of priority populations such as older adults, low-income children, Indigenous populations, newcomers to Canada, people living with physical disabilities or chronic illness, and homeless populations. These population groups are known to be at greater risk for poor health, largely due to inequities in the distribution of the ***social determinants of health***.

*This is one of a series of **Fact Sheets** on broader concepts which relate to all five features of healthy built environments described in the HBE Linkages Toolkit. Like the Toolkit, information provided here is evidence based and derived through literature review and expert opinion.*

Icons indicate that more info is available in a corresponding Fact Sheet:

= ***Economic co-benefits***

= ***Health equity***

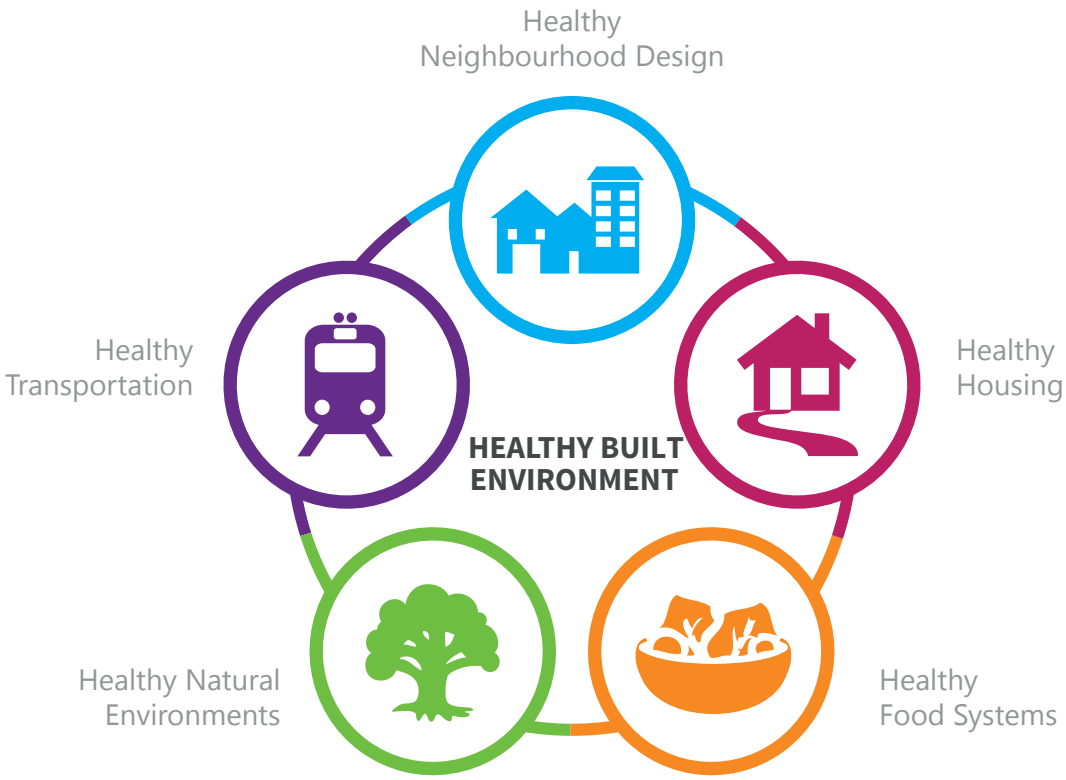
= ***Social well-being***

= ***Small communities***

VISION FOR HEALTHY, EQUITABLE BUILT ENVIRONMENTS

Safe, attractive, and complete neighbourhoods that support equitable opportunities for social connections and food security, access to protected natural environments, as well as accessible options for public and active transportation and housing.

There are two overarching planning principles that can provide an equity lens to any built environment planning process. Additional planning principles are organized according to the five physical features of the built environment outlined in the Healthy Built Environment Linkages Toolkit.[2] This Fact Sheet is intended to build on and complement the Linkages Toolkit and its companion documents.



Five physical features of the built environment.

OVERARCHING PLANNING PRINCIPLES TO SUPPORT HEALTH EQUITY THROUGH THE BUILT ENVIRONMENT:

1

Create opportunities for vulnerable or priority populations to participate in planning and decision-making processes. Design those opportunities so that priority populations are able to participate and fully engage in the process.

- Community involvement is particularly important for identification of structural barriers to the social determinants of health.[3]
- Community-based case studies suggest that community members in low-income and disadvantaged neighbourhoods are uniquely equipped to identify potential sources of inequity and actions needed to address them.[4-7]
- Collaborative assessments or integrated planning processes could involve planners, local and regional governments, developers, health authorities, local organizations, and other relevant groups.

2

Consider the unique needs of vulnerable populations (e.g., low socioeconomic status (SES), elderly, homeless, those with disabilities or chronic health conditions) when planning interventions to the built environment.

- Interventions that are not responsive to the unique needs and barriers of vulnerable groups may exacerbate ***health inequities***.
- Consider doing health equity impact assessments as part of neighbourhood planning processes.[8,9] Due to the lack of research and data on health impacts among sub-populations, it is important to engage in a health equity assessment process to uncover potential health inequities in neighbourhood renewal strategies or other planning processes.

HEALTHY NEIGHBOURHOOD DESIGN

Summary

Variations in neighbourhood density, availability of public spaces and facilities, and community-level services all influence health through their impact on physical and social contexts and on individual behaviours.[10] **These effects may be unequally distributed, leading to disproportionate health burdens among socioeconomically disadvantaged individuals.** Neighbourhood SES is a significant predictor of fair/poor health in all geographic regions in Canada[11]: neighbourhoods with greater community resources and informal social control or cohesion are significantly associated with less depression, anxiety, lower body mass index, and better general health.[12] However, neighbourhood SES alone is not a good proxy for measuring the health of neighbourhoods.[11-13]

There is a lack of direct evidence for how interventions related to neighbourhood design impact health inequities due to confounding factors, diversity in study design, and difficulty generalizing evidence that is rooted in local contexts.[10] **Efforts toward neighbourhood renewal may result in unintended health inequities if the local context and needs of vulnerable populations are not considered in planning processes.** Public and accessible amenities should be prioritized to avoid increasing inequities.

HOW CAN WE ENSURE MORE EQUITABLE ACCESS TO HEALTHY NEIGHBOURHOODS?

Planning Principles:

1

Prioritize enhancement of low-SES neighbourhoods. Preserve, enhance, and renew neighbourhoods with a balance of public and private spaces, infrastructure, and services accessible to all residents, without displacing people.

- Disadvantaged neighbourhoods may be affected by stigma that perpetuates neglect, restricted access and use of public spaces, and a sense of isolation from other neighbourhoods. Such neighbourhoods may need more tailored and intensive investments through an integrated range of service and amenities to ensure equitable opportunities for health afforded by the built environment.[4,10]
- Neighbourhood-level investments in green space and other local amenities may instigate neighbourhood gentrification. Renewal strategies without integrated commitments to affordable housing, transportation, and food, can lead to further marginalization of low-income residents who can no longer afford to live in the very neighbourhoods designed to support them.[14]

- Key factors for supporting health equity in neighbourhoods include affordable housing, access to affordable healthy food, affordable child care and transportation, nearby and connected green spaces with trees, safe and welcoming community spaces, and adequate sanitation services that consider the unique conditions of each neighbourhood.[4,15] Community and neighbourhood grants are a tool that could support community reclamation of restricted use, neglected, or poorly maintained public spaces for community-driven activities, improved safety and aesthetics, or community programs.

2 Balance neighbourhood density targets with provisions for sufficient, safe, connected, accessible, and nearby natural green spaces and play areas for children and youth.

- While the impact of housing density on children's play is unclear, some evidence suggests that increased density may constrain opportunities for play because the lack of indoor and outdoor space limits children's ability to play. Increased green space is significantly associated with increased play, physical activity, and cognitive and motor development in children.[15]

3 Support community-based collaborative land use and planning processes that support health equity and public health.

- Community members can identify priority criteria, which can be used to map a neighbourhood's combined provision of assets such as affordable housing, healthy food, child care, green spaces, public transportation corridors, and safety, and identify where services or infrastructure are needed.[16] This type of "community asset mapping" can highlight potential within a community and inform planning to further develop those assets.

HEALTHY TRANSPORTATION NETWORKS

SUMMARY

Healthy transportation networks prioritize safe and accessible transportation systems for all ages and abilities and incorporate a diversity of transportation modes (e.g., cycling, walking, transit). Health benefits such as reduced pedestrian and cyclist injury, increased physical activity, decreased obesity, and increased social connectivity are associated with safe, attractive and accessible transportation systems that prioritize active transportation.[2]

Equity in transit planning involves considering the needs of different "publics," each of whom may have different identities, transportation needs, visions, and priorities (e.g., people may identify primarily as transit riders, cyclists, pedestrians, car drivers, business people, taxpayers, progressives, etc.).[17] **Access to public transportation is particularly important for people with low incomes or mobility challenges, who may depend on it to get to work, shops, school, and other necessities.** Population sub-groups, such as females, older adults, people of lower socioeconomic status, and people who are overweight or obese are likely to experience greater barriers to walking, primarily related to safety, poor health status and physical disabilities.[18]

HOW CAN WE MAKE HEALTHY TRANSPORTATION NETWORKS MORE EQUITIABLE?

Planning Principles:

1. **Prioritize safety and enjoyment of public and active transportation in low-SES neighbourhoods.** Interventions may include safe street crossings, traffic calming techniques, and enforcement measures such as speed limit reductions; development of linear parks, multi-use trails, greenways and sidewalks, and organization of walking groups.

    - Longitudinal research indicates that young children in low-SES neighbourhoods are more likely to use active transportation to get to school, and are more likely to be exposed to environmental hazards such as dangerous traffic or unsafe neighbourhoods.[19]

2. **Ensure that locations and schedules for public and active transportation options support the daily activity flows of people who depend on them.** Public and active transportation links should connect the places where people live, work, shop for necessities, go to school, and play.

    - Miss-matched transit and work schedules, infrequent transit routes, and poor route connections cost the people who depend on them in terms of time and stress.[20]
    - Consider the risks of increased housing or living costs when new transit developments—positive features that might lead to gentrification—are introduced to a neighbourhood.[17]

HEALTHY NATURAL ENVIRONMENTS

SUMMARY

The built environment can influence the distribution of environmental benefits such as green space, as well as of environmental burdens such as air pollution. There is evidence that socioeconomically disadvantaged people and groups tend to live in more deprived areas with greater environmental burdens, have poorer access to health-supportive environmental amenities, and have less resilience to environmental hazards. **There is consistent evidence that green space provides greater health benefits to lower SES individuals and groups than to the general population.**

HOW CAN WE PROTECT EQUITABLE ACCESS TO HEALTHY NATURAL ENVIRONMENTS WITHIN OUR COMMUNITIES?

Planning Principles:

1

Expand and improve diverse forms of accessible and connected green spaces in underserved and disadvantaged areas to support physical and mental health. This includes the revitalization of parks, especially those that improve travel links and connectedness through the community.

- Multiple studies of green space exposure found stronger positive associations between green space and healthy birth outcomes among mothers of lower SES. Green space may decrease the effect of income deprivation on all-cause and cardiovascular mortality (overall deaths due to any cause or due to cardiovascular disease specifically). The largest benefit from green space exposure, in terms of chronic obstructive pulmonary disease, was observed among lower SES individuals. Associations between green space and reduced mortality are strongest in socioeconomically deprived neighbourhoods, and cannot be explained by increased physical activity.[21,22]
- Evidence from Montreal indicates that areas with recent immigrants have fewer street trees, while evidence from Montreal, Vancouver, and Toronto indicates that lower income areas have less vegetation.[23-25]

2 **Integrate strategies to address poor air quality, extreme heat vulnerability, safety concerns, and chemical and biological hazards that tend to co-exist in disadvantaged neighbourhoods.** Multi-pronged strategies include: zoning and planning to minimize household exposures, installing green barriers between roadways and child-centered settings, training for child health professionals to recognize and respond to environmental risks to children, and policies aimed at reducing children's susceptibility to environmental risk factors through healthy food and physical activity programs.

- Lower SES is associated with increased exposure to air pollution and extreme heat, as well as decreased exposure to green space.[10,24–29] Thus, communities with greater health risks from heat and air pollution exposure may also lack the protective benefits of green space that filters the air, reduces temperatures, and provides shaded and sheltered areas. People with low SES, lack of access to green spaces or air conditioning, pre-existing chronic disease, and those who are elderly or socially isolated are more vulnerable to health impacts during extreme hot weather.[30] In addition to temporary heating or cooling shelters during extreme weather events, consider developing more permanent amenities such as "parklets" with shade and water features in areas that lack access to green space.
- Although socioeconomically disadvantaged groups are not always more exposed to greater levels of air pollution, they often experience greater harmful effects. For example, there is evidence of stronger pollution–mortality associations for people of low SES, even after adjusting for behavioural and occupational risk factors.[10,26] Low-income children are typically more susceptible to the negative health impacts of environmental exposures due to a lack of access to healthy foods, health care, and other resources needed to protect their health.[31]
- There is fragmented but consistent evidence that low-income children are more likely to suffer from multiple and cumulative environmental exposures in and near their home. This includes exposure to biological and chemical hazards, poor air quality, insufficient sanitation, and derelict or unsafe public spaces and play areas.[31]

HEALTHY FOOD SYSTEMS

SUMMARY

People experience ***food insecurity*** when they are unable to access sufficient appropriate, healthy foods, usually due to inability to purchase sufficient quality food. Housing costs are the main expense that takes priority over food for low-income families.[32,33] **People often struggle to balance food expenditures with the cost of housing, transportation, and other necessities.**

HOW DO WE MAKE HEALTHY FOOD SYSTEMS MORE EQUITABLE?

Planning Principles:

1 **Maximize healthy, accessible, and affordable food options near affordable housing and public transit connections.**

- Low-income families can direct more of their money to healthy food if they have access to affordable child care, flexible employment opportunities close to home,[5,34] convenient public transportation links to grocery stores, as well as kitchen storage and cooking facilities.[33]
- Lower income neighbourhoods and those with higher percentages of Indigenous residents may have disproportionately high exposure to unhealthy food outlets.[10,35]

2 **Support a range of food programs that support community self-reliance and social justice for diverse populations.**

- Emerging evidence suggests programs such as community kitchens and gardens can deliver a great range of health benefits, including social cohesion and opportunities to address specific ethno-cultural imbalances of traditionally marginalized groups such as newcomers to Canada and Indigenous populations.[36]
- Vegetable gardens can contribute to the presence of more food in the house, even if they do not mitigate the problem of food insecurity.[33]
- There is limited but consistent evidence of low participation in community food programs among food insecure families, largely because programs are not accessibly located; people lack knowledge of how to participate; or programs are not suited to busy schedules, interests, or needs of families.[37,38] However, community food programs can provide a link between vulnerable community members, program organizers, and local governments.[38] The involvement of vulnerable sub-groups in food program planning may help to develop more relevant programs that address stigma and other barriers to access.

3

Prioritize the unique food system needs of rural and Indigenous communities. Strategies include reducing travel distances to food sources, supporting cultural food preferences, and strengthening partnerships with local food producers and distributers.

- Unique challenges in rural settings include long distances that increase food costs and limit availability of fresh foods, poor responsiveness to cultural food preferences, and difficulties establishing local partnerships to develop community food strategies. The challenges are particularly prevalent among Indigenous communities in the north.
- Indigenous children report high availability of processed and convenience foods and low presence of fruits, vegetables, and traditional foods, even where the latter are enjoyed or considered healthy.[39]
- Indigenous-led food programs may contribute to increased capacity related to cooking and growing food and may support stronger social networks among long-term participants.[36]

4

Develop amenities to minimize food waste. Waste reduction, as well as reclamation and redistribution of quality food can contribute to healthier, more affordable food systems with less environmental impact.

- Food waste can impact global food supply and distribution as well as household access to food.[40] Food waste is a significant contributor to greenhouse gas emissions, both from resources used in the production of wasted food, as well as methane emissions from post-consumer food waste in landfills.[40,41] Local governments can provide options for diverting non-preventable food waste from landfill.
- Waste of spoiled food and uneaten leftovers contributes is responsible for over 25% of household waste in British Columbia.[42] Local governments can support businesses and residents to minimize food waste.

HEALTHY HOUSING

SUMMARY

Healthy housing is affordable, accessible for all, and free of hazards. **Low SES is associated with poorer quality housing characteristics both within and around the home, as well as with crowding and increased exposure to environmental risks both inside (e.g., dampness, mould, chemical contamination, noise, temperature problems, and poor sanitation) and near (e.g., traffic, traffic-related pollution, and industrial pollution) the home.[43]**

Local governments can support access to affordable healthy housing through tools such as provision of diverse housing forms and tenure types; ensuring good housing quality that includes proper housing structure, heating, insulation, and ventilation in all new homes; policies and programs that prioritize the housing needs of the homeless, older adults, low-income groups, and people living with disabilities; and siting and zoning that minimizes exposure to environmental hazards.[2]

HOW CAN WE SUPPORT MORE EQUITABLE ACCESS TO HEALTHY HOUSING?

Planning Principles:

1

Ensure neighbourhood renewal strategies are planned in tandem with affordable housing and access to services to ensure low-income renters are protected from displacement effects of gentrification.

- Housing mobility (support for residents to move from low-income neighbourhoods to higher income neighbourhoods) can improve overall health and mental health, but may also lead to greater health inequalities for those "left behind" or "pushed out" by neighbourhood development.[44]
- There is some evidence that interventions to improve infrastructure and amenities (e.g., affordable child care, well-maintained green spaces, public transportation, access to healthy foods) in low-income neighbourhoods may be more cost-effective and inclusive and have similar impacts as moving individuals to lower poverty areas. Mechanisms include bylaw protection for renters when neighbourhoods are undergoing renewal or redevelopment.

2 **Ensure affordable housing is also quality housing by investing in maintenance and retrofits that prioritize air and water quality, safety, climate control, and accessibility.** Efforts to improve and ensure quality of affordable housing units, such as healthy housing regulations, bylaws, and building codes can ensure a minimum standard for vulnerable people (e.g., low-income, insecure tenure, or physical or mental disabilities) who are unable or less likely to advocate or make improvements for themselves.[45,46]

- Inappropriate housing conditions among Indigenous people, such as overcrowding, homes in need of significant repairs, lack of smoke detectors and extinguishers, and lack of appropriate supports for people with physical disabilities, are associated with greater risks of unintentional injuries, respiratory and infectious diseases, psychosocial challenges, and domestic violence.[47,48]
- Housing conditions of lower SES groups may make them more susceptible to heat-related health risks.[49]
- Improvements in warmth and energy efficiency result in positive health impacts to low income groups, particularly older adults or those living with a pre-existing health condition. Housing that is affordable to heat is linked to improved general health, respiratory health, and mental health and may also promote improved social relationships and reduce absenteeism from school or work due to illness.[44,50]
- The location of housing relative to radon deposits impacts the level of indoor exposure to radon gas. Where radon levels are high, mitigation measures should be used to vent radon and lower indoor concentrations to safe levels. Low-income renters are particularly vulnerable to radon because they are more likely to live in basement suites and have less ability to relocate to higher quality housing. Insecure tenancy may be a barrier to requesting testing and mitigation. Mechanisms should be put in place to require testing and mitigation of ground level and basement rental suites in high radon areas.[51]

GLOSSARY

Food insecurity – Lack of dignified access to sufficient safe and nutritious food to meet dietary needs and food preferences.[52]

Health inequities – Differences in health status that are linked to social disadvantage, and that are considered to be modifiable and thus unfair. Health equity exists when all people have opportunity to meet their full health potential without barriers related to the social determinants of health.[53]

Priority populations – Those at higher risk for poor health, usually related to the social determinants of health, who have restricted access to public health services, or for whom public health interventions are likely to have increased potential for benefit. Examples of priority populations include: older adults, Indigenous groups, newcomers, people with insecure housing, people with food insecurity, and people living with physical and/or mental health barriers.[54]

Social determinants of health – The "interrelated social, political and economic factors that create the conditions in which people live, learn, work and play."[53]

Vulnerable populations – Those at a higher risk for poor health outcomes because of barriers to accessing social, economic, political, and environmental resources, as well as because of existing illness or disability.[53]

References

1. Zupancic T, Westmacott C. Working with local governments to support health through the built environment: a scoping review. Vancouver, BC: BC Centre for Disease Control; 2016 Jun. Available from: http://www.bccdc.ca/health-professionals/professional-resources/health-equity-environmental-health/equity-and-eph-handbook.

2. Provincial Health Services Authority. Healthy built environment linkages: a toolkit for design, planning, health. Vancouver, BC: Provincial Health Services Authority, Population and Public Health; 2014. Available from: http://www.phsa.ca/Documents/linkagestoolkitrevisedoct16_2014_full.pdf.

3. Weiss D, Lillefjell M, Magnus E. Facilitators for the development and implementation of health promoting policy and programs – a scoping review at the local community level. BMC Public Health. 2016;16(1):1-15. Available from: http://dx.doi.org/10.1186/s12889-016-2811-9.

4. Masuda JR, Teelucksingh C, Zupancic T, Crabtree A, Haber R, Skinner E, et al. Out of our inner city backyards: re-scaling urban environmental health inequity assessment. Social Science & Medicine. 2012;75(7):1244-53. Available from: http://www.sciencedirect.com/science/article/pii/S0277953612004029.

5. Chircop A. Public policy analysis to redress urban environmental health inequities. Policy Politics Nursing Practice. 2011;12(4):245-53. Available from: http://ppn.sagepub.com/content/12/4/245.short.

6. Cahuas MC, Wakefield S, Peng Y. Social change or business as usual at city hall? Examining an urban municipal government's response to neighbourhood-level health inequities. Social Science & Medicine. 2015;133:366-73. Available from: http://www.sciencedirect.com/science/article/pii/S0277953614005899.

7. Skinner E, Masuda JR. Right to a healthy city? Examining the relationship between urban space and health inequity by Aboriginal youth artist-activists in Winnipeg. Social Science & Medicine. 2013;91:210-8. Available from: http://www.sciencedirect.com/science/article/pii/S0277953613001020.

8. Ontario Ministry of Health and Long-Term Care, Public Health Ontario. Health Equity Impact Assessment (HEIA) Workbook. Ontario: Queen's Printer for Ontario; 2012. Available from: http://www.health.gov.on.ca/en/pro/programs/heia/docs/workbook.pdf.

9. National Public Health Service for Wales. Worksheets for health inequalities impact assessment and rapid appraisal. Wales: National Public Health Service for Wales; 2004. Available from: http://hiaconnect.edu.au/old/files/HIIA%20_Bro_Taf_all.pdf.

10. Gelormino E, Melis G, Marietta C, Costa G. From built environment to health inequalities: An explanatory framework based on evidence. Preventive Medicine Reports. 2015;2:737-45.

11. White HL, Matheson FI, Moineddin R, Dunn JR, Glazier RH. Neighbourhood deprivation and regional inequalities in self-reported health among Canadians: are we equally at risk? Health & Place. 2011;17(1):361-9. Available from: http://www.sciencedirect.com/science/article/pii/S1353829210001772.

12. O'Campo P, Wheaton B, Nisenbaum R, Glazier R, Dunn JR, Chambers C. The neighbourhood effects on health and well-being (NEHW) study. Health & Place. 2015;31:65-74. Available from: https://dx.doi.org/10.1016/j.healthplace.2014.11.001.

13. Blair A, Gariépy G, Schmitz N. The longitudinal effects of neighbourhood social and material deprivation change on psychological distress in urban, community-dwelling Canadian adults. Public Health. 2015;129(7):932-40. Available from: http://www.sciencedirect.com/science/article/pii/S0033350615002097.

14. Curran W, Hamilton T. Just green enough: contesting environmental gentrification in Greenpoint, Brooklyn. Local Environment. 2012;17(9):1027-42. Available from: http://dx.doi.org/10.1080/13549839.2012.729569.

15. Christian H, Zubrick SR, Foster S, Giles-Corti B, Bull F, Wood L, et al. The influence of the neighborhood physical environment on early child health and development: a review and call for research. Health & Place. 2015;33:25-36. Available from: http://www.sciencedirect.com/science/article/pii/S1353829215000155.

16. Brunelle A, Harris M, Lust C, Marion A, Selin K, Shor D, et al. Affordable housing siting criteria checklist and mapping zones of opportunity for Living Cully's land banking efforts to preserve affordable housing in the Cully neighborhood; 2016. Available from: http://www.danielshor.com/images/living_cully_report.pdf.

17. Hertel S, Keil R, Collens M. Switching tracks: towards transit equity in the Greater Toronto and Hamilton area. Toronto: City Institute, York University; 2015 Mar. Available from: http://suburbs.apps01.yorku.ca/wp-content/uploads/2015/03/Switching-Tracks_9-March-2015.pdf.

18. Clark AF, Scott DM. Barriers to walking: an investigation of adults in Hamilton (Ontario, Canada). International Journal of Environmental Research and Public Health. 2016;13(2):179. Available from: http://www.mdpi.com/1660-4601/13/2/179/htm.

19. Pabayo RA, Gauvin L, Barnett TA, Morency P, Nikiéma B, Séguin L. Understanding the determinants of active transportation to school among children: evidence of environmental injustice from the Quebec longitudinal study of child development. Health & Place. 2012;18(2):163-71. Available from: http://www.sciencedirect.com/science/article/pii/S1353829211001572.

20. Lowe K, Mosby K. The conceptual mismatch: a qualitative analysis of transportation costs and stressors for low-income adults. Transport Policy. 2016;49:1-8. Available from: http://www.sciencedirect.com/science/article/pii/S0967070X16301172.

21. Kardan O, Gozdyra P, Misic B, Moola F, Palmer LJ, Paus T, et al. Neighborhood greenspace and health in a large urban center. Scientific Reports. 2015;5:11610. Available from: http://dx.doi.org/10.1038/srep11610.

22. James P, Banay RF, Hart JE, Laden F. A review of the health benefits of greenness. Current Epidemiology Reports. 2015;2(2):131-42. Available from: http://dx.doi.org/10.1007/s40471-015-0043-7.

23. Pham T-T-H, Apparicio P, Landry S, Séguin A-M, Gagnon M. Predictors of the distribution of street and backyard vegetation in Montreal, Canada. Urban Forestry & Urban Greening. 2013;12(1):18-27. Available from: http://www.sciencedirect.com/science/article/pii/S1618866712000891.

24. Pham T-T-H, Apparicio P, Séguin A-M, Landry S, Gagnon M. Spatial distribution of vegetation in Montreal: an uneven distribution or environmental inequity? Landscape and Urban Planning. 2012;107(3):214-24. Available from: http://www.sciencedirect.com/science/article/pii/S0169204612001880.

25. Tooke TR, Klinkenberg B, Coops NC. A geographical approach to identifying vegetation-related environmental equity in Canadian cities. Environment and Planning B: Planning and Design. 2010;37(6):1040-56. Available from: http://epb.sagepub.com/content/37/6/1040.abstract.

26. Deguen S, Zmirou-Navier D. Social inequalities resulting from health risks related to ambient air quality—a European review. The European Journal of Public Health. 2010;20(1):27-35. Available from: http://eurpub.oxfordjournals.org/content/eurpub/20/1/27.full.pdf.

27. Sider T, Alam A, Zukari M, Dugum H, Goldstein N, Eluru N, et al. Land-use and socio-economics as determinants of traffic emissions and individual exposure to air pollution. Journal of Transport Geography. 2013;33:230-9. Available from: http://www.sciencedirect.com/science/article/pii/S0966692313001555.

28. Sider T, Hatzopoulou M, Eluru N, Goulet-Langlois G, Manaugh K. Smog and socioeconomics: an evaluation of equity in traffic-related air pollution generation and exposure. Environment and Planning B: Planning and Design. 2015;42(5):870-87. Available from: http://epb.sagepub.com/content/42/5/870.abstract.

29. Carrier M, Apparicio P, Séguin A-M, Crouse D. The application of three methods to measure the statistical association between different social groups and the concentration of air pollutants in Montreal: a case of environmental equity. Transportation Research Part D: Transport and Environment. 2014;30:38-52. Available from: http://www.sciencedirect.com/science/article/pii/S1361920914000273.

30. Bélanger D, Gosselin P, Valois P, Abdous B. Perceived adverse health effects of heat and their determinants in deprived neighbourhoods: a cross-sectional survey of nine cities in Canada. International Journal of Environmental Research and Public Health. 2014;11(11):11028-53. Available from: http://www.mdpi.com/1660-4601/11/11/11028/htm.

31. Bolte G, Tamburlini G, Kohlhuber M. Environmental inequalities among children in Europe—evaluation of scientific evidence and policy implications. European Journal of Public Health. 2010;20(1):14-20. Available from: http://eurpub.oxfordjournals.org/content/20/1/14.abstract.

32. Kirkpatrick SI, Tarasuk V. Assessing the relevance of neighbourhood characteristics to the household food security of low-income Toronto families. Public Health Nutrition. 2010;13(7):1139-48. Available from: http://dx.doi.org/10.1017/S1368980010000339.

33. Gorton D, Bullen CR, Mhurchu CN. Environmental influences on food security in high-income countries. Nutrition Reviews. 2010;68(1):1-29. Available from: http://nutritionreviews.oxfordjournals.org/content/nutritionreviews/68/1/1.full.pdf.

34. Loopstra R, Tarasuk V. The relationship between food banks and household food insecurity among low-income Toronto families. Canadian Public Policy. 2013;38(4):497-514. Available from: http://muse.jhu.edu/journals/canadian_public_policy/v038/38.4.loopstra.html.

35. Hilmers A, Hilmers DC, Dave J. Neighborhood disparities in access to healthy foods and their effects on environmental justice. American Journal of Public Health. 2012;102(9):1644-54. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3482049/pdf/AJPH.2012.300865.pdf.

36. Mundel E, Chapman GE. A decolonizing approach to health promotion in Canada: the case of the Urban Aboriginal Community Kitchen Garden Project. Health Promotion International. 2010;25(2):166-73. Available from: http://heapro.oxfordjournals.org/content/25/2/166.short.

37. Loopstra R, Tarasuk V. Perspectives on community gardens, community kitchens and the Good Food Box program in a community-based sample of low-income families. Canadian Journal of Public Health. 2013;104(1):e55-e9. Available from: http://journal.cpha.ca/index.php/cjph/article/view/3528.

38. Fridman J, Lenters L. Kitchen as food hub: adaptive food systems governance in the City of Toronto. Local Environment. 2013;18(5):543-56. Available from: http://dx.doi.org/10.1080/13549839.2013.788487.

39. Genuis SK, Willows N, Alexander First N, Jardine C. Through the lens of our cameras: children's lived experience with food security in a Canadian Indigenous community. Child: Care, Health and Development. 2015;41(4):600-10. Available from: http://dx.doi.org/10.1111/cch.12182.

40. Papargyropoulou E, Lozano R, K. Steinberger J, Wright N, Ujang Zb. The food waste hierarchy as a framework for the management of food surplus and food waste. Journal of Cleaner Production. 2014;76:106-15. Available from: http://www.sciencedirect.com/science/article/pii/S0959652614003680.

41. Vermeulen SJ, Campbell BM, Ingram JSI. Climate Change and Food Systems. Annual Review of Environment and Resources. 2012;37(1):195-222. Available from: http://www.annualreviews.org/doi/abs/10.1146/annurev-environ-020411-130608.

42. Gottfried A, Frank J, Shulman T, Yang W. Residential food waste prevention: Toolkit for local government and non-governmental organizations. Victoria, BC: BC Ministry of Environment; 2015. Available from: http://www2.gov.bc.ca/assets/gov/environment/waste-management/recycling/organics/resources/food_waste_reduction_toolkit.pdf.

43. Braubach M, Fairburn J. Social inequities in environmental risks associated with housing and residential location—a review of evidence. The European Journal of Public Health. 2010;20(1):36-42. Available from: http://eurpub.oxfordjournals.org/content/eurpub/20/1/36.full.pdf.

44. Gibson M, Petticrew M, Bambra C, Sowden AJ, Wright KE, Whitehead M. Housing and health inequalities: a synthesis of systematic reviews of interventions aimed at different pathways linking housing and health. Health & Place. 2011;17(1):175-84. Available from: http://www.sciencedirect.com/science/article/pii/S1353829210001486.

45. Stewart J, Bourn C. The environmental health practitioner: new evidence-based roles in housing, public health and well-being. Perspectives in Public Health. 2013;133(6):325-9. Available from: http://rsh.sagepub.com/content/133/6/325.abstract.

46. Rideout K. Areas of EPH practice impacted by the social determinants of health. Vancouver, BC: BC Centre for Disease Control; 2016. Available from: http://www.bccdc.ca/resource-gallery/Documents/Educational%20Materials/EH/BCCDC_primer_2.pdf.

47. Kolahdooz F, Nader F, Yi KJ, Sharma S. Understanding the social determinants of health among Indigenous Canadians: priorities for health promotion policies and actions. 2015. 2015;8:27968. Available from: http://www.globalhealthaction.net/index.php/gha/article/view/27968.

48. Alaazi DA, Masuda JR, Evans J, Distasio J. Therapeutic landscapes of home: exploring Indigenous peoples' experiences of a Housing First intervention in Winnipeg. Social Science & Medicine. 2015;147:30-7. Available from: http://www.sciencedirect.com/science/article/pii/S0277953615301969.

49. Bélanger D, Gosselin P, Valois P, Abdous B. Neighbourhood and dwelling characteristics associated with the self-reported adverse health effects of heat in most deprived urban areas: a cross-sectional study in 9 cities. Health & Place. 2015;32:8-18. Available from: http://www.sciencedirect.com/science/article/pii/S1353829214001932.

50. Thomson H, Thomas S, Sellstrom E, Petticrew M. Housing improvements for health and associated socio-economic outcomes. Cochrane Database of Systematic Reviews. 2013(2):Art. No.: CD008657. Available from: http://dx.doi.org/10.1002/14651858.CD008657.pub2.

51. Nicol A-M, Rideout K, Barn P, Ma L, Kosatsky T. Radon: public health professionals can make a difference. Environmental Health Review. 2015;58(1):7-8. Available from: http://pubs.ciphi.ca/doi/abs/10.5864/d2015-003.

52. Food and Agriculture Organization of the United Nations. Committee on World Food Security2014. Available from: http://www.fao.org/cfs/en/.

53. National Collaborating Centre for Determinants of Health. Glossary of essential health equity terms. Antigonish, NS: National Collaborating Centre for Determinants of Health, St. Francis Xavier University; 2015 February. Available from: http://nccdh.ca/resources/glossary/.

54. Ontario Agency for Health Protection and Promotion (Public Health Ontario), Tyler I, Hassen N. Priority populations project: understanding and identifying priority populations for public health in Ontario. Toronto, ON: Queen's Printer for Ontario; 2015. Report No.: 978-1-4606-6562-6. Available from: https://www.publichealthontario.ca/en/eRepository/Priority_Populations_Technical_Report.pdf.

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