HEALTHY BUILT ENVIRONMENT LINKAGES
A TOOLKIT FOR DESIGN • PLANNING • HEALTH

HEALTHY NEIGHBOURHOOD DESIGN

PROMOTING EQUITY • ACCESS • DESIGN FOR ALL AGES

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This toolkit is a project of the PHSA Population & Public Health team under the leadership of the Healthy Built Environment Alliance (HBEA).

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What is the built environment?

The phrase “built environment” refers to the human-made or modified physical surroundings in which people live, work and play. These places and spaces include our homes, communities, schools, workplaces, parks/recreations areas, business areas and transportation systems, and vary in size from large-scale urban areas to smaller rural developments.

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ACKNOWLEDGEMENTS

Who developed this resource?

This resource is one of a series of products developed under the leadership of BC's Healthy Built Environment Alliance (HBEA) – a network that brings together public health professions, design professions and land use planning professional organizations to better understand the impact of the built environment on health and well-being, and to provide leadership for healthier, more livable communities. Additional resources can be found at:

www.phsa.ca/populationhealth

This toolkit draws on many sources for which we are grateful. In particular, members of the HBE Linkages Toolkit Working Group and Advisory Groups provided invaluable feedback and advice at all stages of the work.

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PROJECT OVERVIEW

This foundational document is intended to:

- Facilitate conversations between public health practitioners, planners and others involved in land-use and transportation planning.
- Assist toolkit users in applying health evidence.
- Inform built environment decision-making processes.
- Be a navigational tool to the literature, directing people to further information.

What are we trying to do?

We want to link community design, planning and health. Public health, community planners, and others involved in the design of, and decision making for communities share a responsibility to promote active living approaches and to shape healthier built environments.

The Linkages Toolkit provides consistent evidence-based and expert-informed messages for use in communications and discussion around health and the built environment. It provides a roadmap for emerging and innovative evidence.

The toolkit content is grouped by five physical features of the built environment: neighbourhood design, transportation networks, natural environments, housing, and food systems. For each physical feature, evidence has been assessed and the information is organized according to vision statements, planning principles, impacts, and health-related outcomes.

Who might use this resource?

The primary audience for the Linkages Toolkit is public health practitioners involved in healthy built environment work, planners, design professionals and land-use and transportation planning professionals such as architects and engineers, and others involved in the design of communities such as decision-makers in municipal and regional governments. We intend for this resource to serve as a conversation-starter between public health practitioners and these various audiences.

How might this resource be used?

We anticipate that different individuals or groups might use different layers of this toolkit for various purposes depending on the audience and setting. For example, the Healthy Built Environment Linkages diagram and planning principles (pg.15-16) are communication pieces that could be used to articulate the many ways in which the five physical features contribute to health and to show others how they have a role to play, by highlighting intersections between different sectors and stakeholders. The Health Evidence Diagrams that articulate the strength of evidence (pg. 43-47) might be of most interest to health and planning professionals who want to dig deeper into, and potentially add to the evidence base.

PROJECT OVERVIEW

More specific examples of how this tool might be used:

- As a framework for organizing information and presentations at workshops, webinars or conferences on the healthy built environment.
- As a starting point for informing the development of funding proposals, briefing documents or background papers to obtain support for healthy built environment work.
- To provide and organize background information in staff reports on certain policy and program issues (e.g., new community gardens, new subsidized housing developments, and support for the development of transit networks).
- As a framework to help guide the creation of, and content for long-range plans and strategies (e.g., Official Community Plans, Neighbourhood Plans, Park Master Plans, and Transportation Plans).
- As a basis for partnership in order to carry out activities that are important to the community but fall outside the direct role of local governments (e.g., new school programs, delivery of community food security programs).

Note: We recognize that there are some planning principles over which certain audiences have no direct control. We felt it was important, however, that this toolkit include the entire range of planning principles necessary for healthy built environments.

How did we decide what information to include in the resource?

This is a foundational document. Our intention was to develop a core set of principles that would ideally be addressed in any planning process. The principles were not intended to be a prescriptive list which dictates HBE principles to planners and local government. They are at a high enough level that some of the elements can be applied differently in different settings (i.e., rural, suburban, and urban).

The following criteria helped us make decisions about which principles to include in the toolkit:

- Concentrate on principles for which the evidence is strongest, however, at the same time be mindful of groupings or elements which might be unfairly rejected due to a lack of evidence at this time, or are difficult to study with traditional epidemiological methods.
- Include information that is relevant to planners and developers and is relevant at the municipal level.
- Focus on areas where health can bring value in terms of information and evidence to the planning table.
- Aim to be short, digestible and clear.
- Avoid being prescriptive.
- Avoid being overly specific to particular settings or types of communities.
- Avoid micro-level elements such as specific design targets or performance measures.

PROJECT OVERVIEW

How is this different from other planning toolkits out there?

This resource works through the entire pathway of tracking what happens between planning principles and health outcomes. In some cases this toolkit may highlight principles or relationships that are already commonly included in planning processes, but it adds the weight of health evidence behind them. The content is evidence-based and expert-informed.

This resource is essentially a communications toolkit that identifies and describes linkages and relationships, and provides a framework for thinking and talking about health and the built environment – it will not tell you how to do the work – there are many other tools and resources available that provide that information. This resource is intended to be a conversation starter regarding ”what” to do. To learn more about “how” to best implement these principles, see resources like:

planh.ca

PlanH supports local government engagement and partnerships across sectors for creating healthier communities and provides learning opportunities, resources, and leading-edge practices for collaborative local action. The PlanH website complements the Linkages Toolkit by providing information about available resources (e.g., publications, links, videos, action guides), training & support, funding opportunities, success stories and events. The website is a gateway to more resources.

www.uphn.ca/CLASP/

With funding from the Canadian Partnership Against Cancer’s “Coalitions Linking Action and Science for Prevention (CLASP)” program, the Healthy Canada by Design CLASP initiative is uniting existing and emerging cross-sector efforts in six health regions across Canada to promote healthy built environments. This website provides an overview of the CLASP projects, and tools & resources to support policy-makers, public health officials, planners and developers in facilitating the creation of more health promoting communities across Canada.

PROJECT OVERVIEW

www.cip-icu.ca

The Canadian Institute of Planners (CIP) is a collaborative national federation working on behalf of planners and the planning profession to serve as the national voice for Canada's planning community. The CIP website outlines its 2012-2014 Strategic Plan, and provides links to CIP publications (e.g., CIP Professional Practise Manual) and national and international projects (this section highlights some of the projects that CIP members are currently involved in as well as summaries on completed projects). National projects include collaborative work with First Nations' communities and organizations to enhance land use planning within First Nations' communities, and the launch of the Climate Change Impacts Adaptation program funded by Natural Resources Canada. The CIP has been engaged in various international projects for over 20 years as a way to build education and awareness, develop employment and business opportunities, and assist in international cooperation and development.

www.ncceh.ca/en/additional_resources?topic=89&subtopic=159

The National Collaborating Centre for Environmental Health (NCCEH) is one of six collaborating centres across Canada created for the purpose of fostering linkages within the public health community. The built environment is currently one of NCCEH's major project areas. The NCCEH has developed an annotated inventory of resources on the built environment developed in partnership with the Canadian Institute of Planners, the Urban Public Health Network (UPHN), and the Canadian Partnership Against Cancer's CLASP initiative. These resources include readiness assessment tools, fact sheets, case studies, as well as evidence reviews.

APPROACH

GENERAL DESCRIPTION

We conducted a literature review process for each of the five physical features. Please see the Evidence Review Methodology section for an overview of the steps. Key information gathered from individual studies was organized into a spreadsheet that included details such as: study design, target population, independent and dependent variables, and reviewer assessments made about the studies such as confidence in findings, and a quality assessment of the source.

We established advisory groups consisting largely of planners, but also including content experts (e.g. academics) for each of the physical features. During the literature review process, advisory group members provided advice and guidance on planning principles on which to base initial evidence searches, highlighted areas requiring further research, provided feedback on the emerging research links, made suggestions for key resources to access, and provided guidance regarding appropriate language.

We used data from the individual studies to create a collective evidence base by systematically clustering together study findings. A grading system developed by PHSA (see the Grading System description for more detail) was then applied to the collective evidence base to assess the strength of the study findings supporting the various links between planning principles, impacts and health outcomes. The results formed the basis for all the toolkit resources. The strength of the evidence is depicted in the Evidence Summary graphics using different types of lines (see the legend in each of the graphics on pg. 43-47).

It is important to note that in many cases the evidence is indirect – there is sometimes little evidence showing that a particular planning principle is directly associated with a specific health outcome. In these cases, we were more effectively able to make the links between the broad planning principles and the health outcomes indirectly (i.e. via the impacts).

The concepts of equity, accessibility and design for all ages are addressed to varying extents in this toolkit. The literature on whether and how planning principles promote equity is scarce but was considered where it was available. Accessibility was addressed in the housing and neighbourhood design sections. Evidence is still emerging in these areas, and future reviews could consider looking more systematically at all of these concepts.

EVIDENCE REVIEW METHODOLOGY

An overview of the evidence review for each of the five physical features is as follows:

1. Conducted an initial scoping literature review to gain a sense of the breadth and depth of the available research related to planning principles, impacts and health outcomes.
2. Drafted an initial set of planning principles from which to work.
3. Used the draft principles on which to base a more thorough literature review using multiple academic databases – this search was focused on attaining peer-reviewed, systematic reviews from reputable scientific journals.
4. Consulted other types of recently published high quality, primary research (e.g., peer reviewed journals and grey literature) when an insufficient number of systematic reviews was available for a specific topic.

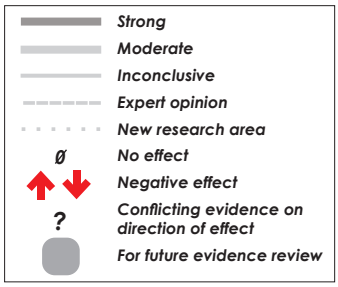
APPROACH

For a more thorough description of the evidence review methodology, please connect with the project leaders. Their contact information is available on pg.2.

GRADING SYSTEM

Once the collective evidence base was created, a grading system developed by PHSA was applied to assess the strength of evidence for the links between planning principles, impacts and health outcomes. This system was informed by existing grading systems and tailored to suit the needs of this project. It classified the evidence links according to criteria such as the number, type and quality of included studies, consistency between studies, and degree of confidence in the collective findings. Where evidence was limited, the expert knowledge of the advisory group members was also factored into the link strength and used to identify additional areas of study that should be reflected in the toolkit. The following link strengths appear in legends on the Health Evidence Diagrams (pg. 43-47).

Health Evidence Diagram Legend



Thicker, darker lines indicate stronger relationships. Coloured bubbles around the impacts and outcomes (as compared to grey bubbles) mean the evidence is clearer about this effect. Below are explanations of the symbols used in the legends.

Strong: Consistent findings from good quality research.

Moderate: Link is supported by research, but is lacking in terms of quality or consistency.

Inconclusive: Inconsistent findings, often from a limited number of studies. No conclusions can be drawn from the research we reviewed.

Expert opinion: We found no or a very limited number of studies, but the link is supported by expert knowledge.

New research area: A search has been undertaken, but there is insufficient research to indicate "moderate" or "strong" strength of evidence because the research topic is new and the evidence is still emerging.

Negative effect: Red arrows indicate an undesirable change.

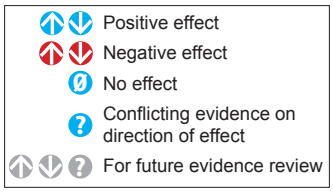
No effect: Null symbol indicates the research shows no change in the impact or outcome.

Question marks: Indicate that direction of change is not known because there is either insufficient or inconsistent evidence, or because we have not yet searched for evidence.

For future evidence review: Grey circles indicate that we have not yet searched for evidence, but inclusion of the impact or outcome is recommended by expert advice or a search has been done, but we have not yet had the time to thoroughly review the evidence.

APPROACH

Linkages Summary Legend



The legends included in the Linkages Summaries (pg. 38-42) summarize the directionality of the impacts and health related outcomes as related to the planning principles. The Linkages Summaries are different from the Health Evidence Diagrams in that they don't graphically depict the strengths of evidence, but rather focus on the directionality of the impact and health related outcome relationships. Below are explanations of the symbols used in the legends.

Positive effect: Coloured circles indicate a desirable change.

Negative effect: Red circles indicate an undesirable change.

No effect: Null symbol indicates research shows no change in the impact or outcome.

Up arrow: Indicates an increase in the effect.

Down arrow: Indicates a decrease in the effect.

Unknown direction of effect: Question marks indicate that direction of change is not known because there is either insufficient or inconsistent research, or because we have not yet searched for research.

For future evidence review: Grey circles indicate that the effect was predicted by expert knowledge, to be confirmed by future research review, or that the effect was predicted by some review of the evidence, but we did not have time to thoroughly review the evidence to confirm this effect.

APPROACH

SCOPE AND LIMITATIONS

While we acknowledge that policy strongly influences the built environment, there was a careful decision made to focus on the physical features of the outdoor built environment and their respective health related outcomes. Physical features were generally restricted to larger scale elements.

We were limited by time and resource constraints in our evidence review and therefore focused primarily on systematic reviews. One limitation of this strategy is that more recent primary studies have not yet been included in published reviews. In other cases, we think there is probably evidence out there but we either couldn't find it, didn't have time to find it, or research hasn't yet been done in the particular area. There may be evidence in case studies, qualitative evidence or promising practices that were not explored in our search. As such, we view this toolkit as an initial stage in building a comprehensive evidence base for links between the planning principles and health related outcomes.

Even with these limitations, we are confident that the toolkit is a good representation of the most important elements of a healthy built environment. We used information from the evidence review combined with expert input from the advisory groups to guide the content. The toolkit is therefore evidence-based and expert-informed.

USER GUIDE
WILL IT WORK IN MY COMMUNITY?

PLANNING YOUR COMMUNITY
When using the toolkit, keep the following in mind:

Context is key: is it right for my community?

When deciding if interventions are right for your community, it is important to consider factors such as the location and population of your community, existing community health issues, community preferences, as well as the context of the research supporting the interventions[1]. These considerations will help to determine if the planning approach is applicable or transferable to your community, and if they can be successfully implemented. Rather than a prescriptive set of rules, the material in this toolkit provides a starting point to ***ask the right questions in your local context.***

Quality of evidence: how much do we know?

Academic research regarding links between the built environment and health has increased at a rapid rate over the last five to ten years. However, a number of methodological issues and gaps still exist in the literature. This resource is intended to facilitate ***evidence-informed decisions*** that take into account the context in which decisions are made.

Non-urban areas: what new opportunities exist?

Much of the research linking community planning and design with health has focused on the urban environment. ***Ways in which the physical environments of non-urban areas affect health is less well known.*** Strategies that have worked in urban environments may be successful in non-urban settings; however, it is important to make evidence-informed decisions and consider the local context when planning to implement new strategies. As such, strategies to support or improve health in non-urban communities may be different.

Equity and access: who will be included?

Care must be taken ***to ensure the community's most vulnerable members are supported.*** Apply an "equity lens" with an emphasis on age- and child-friendly design, and supporting vulnerable populations, such as those with low incomes, mental illness or disabilities.

Why link community design, planning and health?

Public health practitioners, community planners, designers and decision-makers in municipal and regional governments share a responsibility to promote active living, and to shape healthier built environments in order to promote good health.

What is the built environment?

The phrase "built environment" refers to the human-made or modified physical surroundings in which people live, work and play. These places and spaces include our homes, communities, schools, workplaces, parks/recreations areas, business areas and transportation systems, and vary in size from large-scale urban areas to smaller rural developments.

[1]Contextual considerations identified in this user guide were informed by work conducted by Nicholas Smith in 2012 for Dr. Helena Swinkels, MHO, Fraser Health.

PHYSICAL FEATURES OF A HEALTHY BUILT ENVIRONMENT

Healthy Neighbourhood Design

Vision:
Neighbourhoods where people can easily connect with each other and with a variety of day-to-day services.

Healthy Transportation Networks

Vision:
Safe and accessible transportation systems that incorporate a diversity of transportation modes and place priority on active transport (e.g., cycling, walking and transit) over the use of private vehicles.

Healthy Housing

Vision:
Affordable, accessible, and good quality housing for all that is free of hazards and enables people to engage in activities of daily living while optimizing their health.

Healthy Natural Environments

Vision:
a built environment where natural environments are protected and natural elements are incorporated, and are experienced by and accessible to all.

Healthy Food Systems

Vision:
A built environment that can support access to and availability of healthy foods for all.

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PLANNING PRINCIPLES FOR A HEALTHY BUILT ENVIRONMENT

Healthy Neighbourhood Design

1. Enhance neighbourhood walkability
2. Create mixed land use
3. Build complete and compact neighbourhoods
4. Enhance connectivity with efficient and safe networks
5. Prioritize new developments within or beside existing communities

Vision: *Neighbourhoods where people can easily connect with each other and with a variety of day-to-day services.*

Healthy Transportation Networks

1. Enable mobility for all ages and abilities
2. Make active transportation convenient and safe
3. Prioritize safety
4. Encourage use of public transit
5. Enable attractive road, rail and waterway networks

Vision: *Safe and accessible transportation systems that incorporate a diversity of transportation modes and place priority on active transport (e.g., cycling, walking and transit) over the use of private vehicles.*

Healthy Natural Environments

1. Preserve and connect open space and environmentally sensitive areas
2. Maximize opportunities to access and engage with the natural environment
3. Reduce urban air pollution
4. Mitigate urban heat island effect

Vision: *A built environment where natural environments are protected and natural elements are incorporated, and are experienced by and accessible to all.*

Healthy Food Systems

1. Enhance agricultural capacity
2. Increase access to healthy foods in all neighbourhoods
3. Improve community-scale food infrastructure and services

Vision: *A built environment that can support access to and availability of healthy foods for all.*

Healthy Housing

1. Increase access to affordable housing through provision of diverse housing forms and tenure types
2. Ensure adequate housing quality for all segments of society
3. Prioritize housing for the homeless, elderly, low income groups, and people with disabilities
4. Site and zone housing developments to minimize exposure

Vision: *Affordable, accessible, and good quality housing for all that is free of hazards and enables people to engage in activities of daily living while optimizing their health.*

The order in which the physical features and principles are listed is not necessarily an indication of their priority or strength of eevidence.

HEALTHY NEIGHBOURHOOD DESIGN
FACT SHEET

SUMMARY

Neighbourhoods are the places where we live, work and play. **How we design our neighbourhoods is vitally important to our health and well-being.** Land use decisions such as zoning, transportation systems and neighbourhood design significantly influence health. Consider, for instance, the distances people must travel to work, the convenience of buying healthy foods, or the safety of a park: these factors can promote good nutrition, physical activity and increase leisure time. The outcome can be better mental and physical health.

The "three Cs" of healthy neighbourhoods (complete, compact, and connected) have a variety of benefits. These neighbourhoods encourage "active transportation" (primarily walking, cycling and the use of public transit).

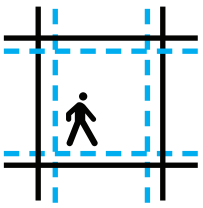
Vision:

Neighbourhoods where people can easily connect with each other and with a variety of day-to-day services.

WHAT DO HEALTHY NEIGHBOURHOODS LOOK LIKE?

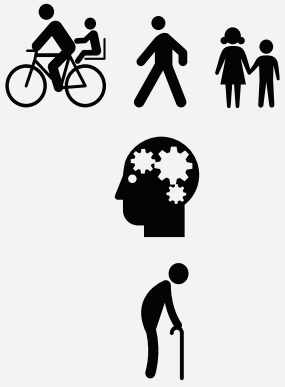
Planning Principle:

1. Enhance neighbourhood walkability



Walkable neighbourhoods are typically characterized by higher residential density, increased mixed land use, and high connectivity.

- A walkable built environment is supportive of physical activity, including walking and cycling for active transport or leisure.
- Research suggests a positive association between walkable land-use patterns and employment productivity.
- Grid-based neighbourhoods, rather than cul-de-sacs, can increase walking and cycling and reduce vehicle use.
- Walkable neighbourhoods positively influence the overall mobility and physical activity levels of older adults.



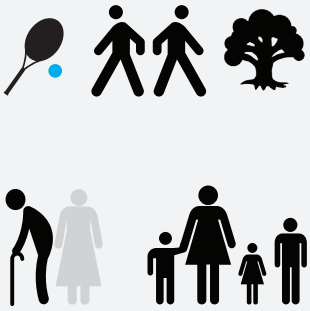
HEALTHY NEIGHBOURHOOD DESIGN
FACT SHEET

Planning Principle:

2. Create mixed land use

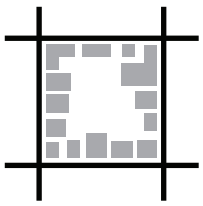
Create neighbourhoods with access to: schools, civic services, green space, retail, employment opportunities, and housing.

- Having access to a variety of amenities within close proximity of home makes active transportation or recreational physical activity more convenient. In general, increasing the mix of land use and proximity of amenities is important for encouraging physical activity.
- There are many gaps in the research pertaining to how aspects of the built environment impact vulnerable populations such as those with low incomes, mental illness or disabilities and those in urban vs. suburban and rural settings.
- Research indicates that access to recreation facilities is important to help residents meet their physical activity needs. This is especially true for suburban residents who rely more on recreation for physical activity.



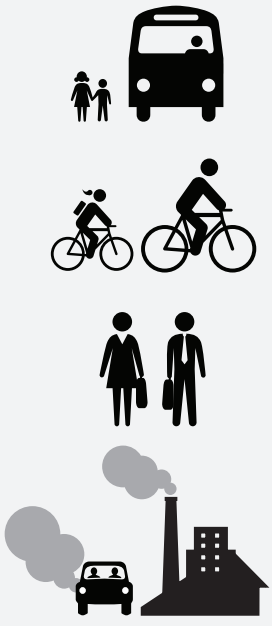
Planning Principle:

3. Build complete and compact neighbourhoods



Compact neighbourhoods have high residential and employment density.

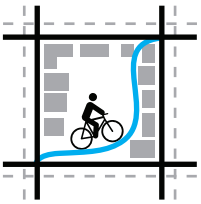
- Increasing residential density may help to promote active school transport amongst school-aged youth.
- Numerous studies identify distance as a barrier to engaging in active transportation. Densification can increase proximity to work, school, and recreational opportunities, therefore increasing engagement in walking, cycling and physical activity.
- Density has been shown to promote healthy behaviour such as active transportation. However, decision-makers should also recognize that under certain circumstances compact growth has been associated with increased personal exposure to air pollutants. Strategies to mitigate this negative impact, such as building setbacks and lowering vehicle speed limits, should be considered.
- Densely developed neighbourhoods should be designed with spaces in mind that foster opportunities for social interaction, as high density neighbourhoods have been associated with social isolation and a decrease in mental health.



HEALTHY NEIGHBOURHOOD DESIGN
FACT SHEET

Planning Principle:

4. Enhance connectivity with efficient and safe networks

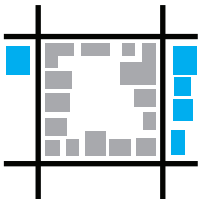


Develop a street network with high connectivity for walking, cycling, and use of public transit.

- Enhancing connectivity can encourage people to walk or cycle for recreational or transportation purposes. Connectivity has the potential to increase total physical activity levels.
- Enhancing street connectivity or intersection density provides active transportation users with more direct routes, thereby reducing travel time to a destination. Decision-makers should consider prioritizing connectivity to promote the utilization of active transportation.
- Studies suggest that creating a compact street grid will help to make a neighbourhood safer for drivers, pedestrians and cyclists. By prioritizing efficient travel for cyclists and pedestrians rather than drivers, the entire transportation system stands to benefit.
- There remain research gaps in whether improving connectivity at the level of the community, neighbourhood, or housing complex, or some combination of all of these levels, is most important for increasing levels of physical activity.

Planning Principle:

5. Prioritize new developments within or beside existing communities



Utilize infill and brownfield reclamation to avoid sprawl.

- The amount of time people spend driving can be reduced when infill development occurs in areas close to transit infrastructure, employment, and other amenities.
- Infill development is one way to encourage densification. Using vacant or underutilized land in a neighbourhood can help prevent the negative effects of sprawl.

HEALTHY NEIGHBOURHOOD DESIGN
FACT SHEET

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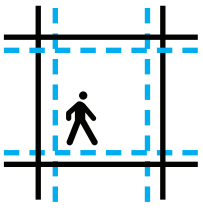
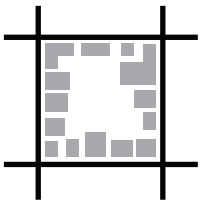
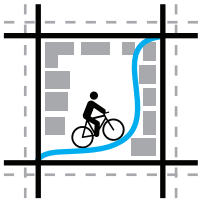
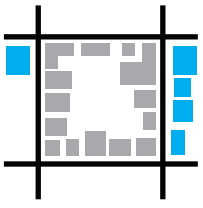
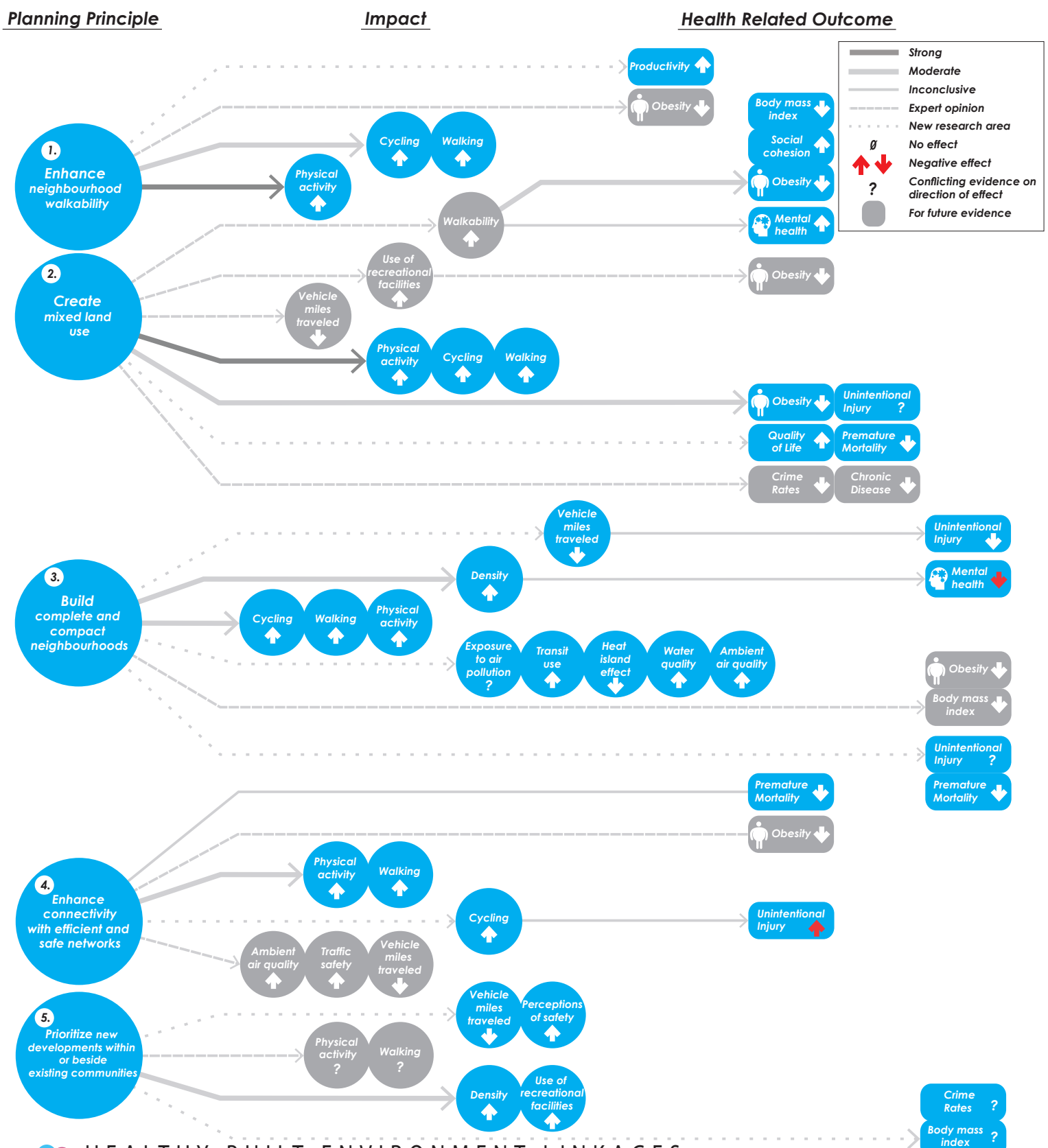
HEALTHY NEIGHBOURHOOD DESIGN
LINKAGES SUMMARY

PLANNING PRINCIPLE	IMPACT	HEALTH RELATED OUTCOME
1. Enhance neighbourhood walkability		
 Walkable neighbourhoods are typically characterized by higher residential density, increased mixed land use, and high connectivity.	↑ cycling ↑ walking ↑ physical activity	↓ obesity ↑ employment productivity
2. Create mixed land use		
 Create neighbourhoods with access to: schools, civic services, green space, retail, employment opportunities, and housing.	↑ walkability ↑ use of recreational facilities ↑ physical activity ↑ walking ↑ cycling ↓ vehicle miles traveled	↓ obesity/body mass index ↑ mental health ↑ social cohesion ? unintentional injury ↑ quality of life ↓ crime rates ↓ premature mortality ↓ chronic disease
3. Build complete and compact neighbourhoods		
 Compact neighbourhoods have high residential and employment density.	↓ vehicle miles traveled ↑ ambient air and water quality ↑ transit use ↓ heat island effect ? exposure to air pollution ↑ physical activity ↑ cycling and walking ↑ density	↓ unintentional injury ↓ mental health ↓ body mass index ↓ obesity ↓ premature mortality
4. Enhance connectivity with efficient and safe networks		
 Develop a street network with high connectivity for walking, cycling, and use of public transit.	↓ vehicle miles traveled ↑ ambient air quality ↑ traffic safety ↑ cycling ↑ walking ↑ physical activity	↓ obesity ↑ unintentional injury ↓ premature mortality
5. Prioritize new developments within or beside existing communities		
 Utilize infill and brownfield reclamation to avoid sprawl.	↓ vehicle miles traveled ↑ use of recreational facilities ↑ density ↑ perceptions of safety ? walking ? physical activity	? body mass index ? crime rates

↑↓ Positive effect
↑↓ Negative effect
Ø No effect
? Conflicting evidence on direction of effect
↑↓? For future evidence review

HEALTHY NEIGHBOURHOOD DESIGN
EVIDENCE DIAGRAM



GLOSSARY

Active transportation: Active transportation refers to any form of human-powered transportation such as walking, cycling, using a wheelchair, in-line skating or skateboarding. People often combine the use of active transportation with public transit as a complementary means of getting around (Public Health Association of Canada and Montréal Urban Ecology Centre).

Agricultural capacity: The potential for agriculture based on class ratings for various types of land (e.g., Class 7 is considered non-arable, with no potential for soil bound agriculture) (BC Agricultural Land Reserve).

Biodiversity: The short form for biological diversity, which is the diversity, or variety, of plants and animals and other living things in a particular area or region (California Biodiversity Counsel).

Biological productivity: Also known as bioproductivity, it is the rate and amount of production which occurs in a given ecosystem over a given time period (Michel Serres Institute).

Body Mass Index (BMI): A simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in metres (kg/m^2) (World Health Organization).

Brownfields: Usually former industrial lands that are now vacant or underused but have the potential to be redeveloped for new uses. Brownfields may be contaminated due to past or present activities. Examples of brownfields include: closed factories, gas stations, and waterfront lands formerly used for commercial port operations (Ontario Ministry of the Environment).

Cardiovascular disease: Also referred to as heart disease, or heart and blood vessel disease, it includes numerous problems, many of which are related to a process called atherosclerosis. Atherosclerosis is a condition that develops when a substance called plaque builds up in the walls of the arteries. This build-up narrows the arteries, making it harder for blood to flow through (American Heart Association).

Chronic disease: Also referred to as non-communicable disease, is not passed from person to person, but rather they are of long duration and generally slow progression. The four main types of chronic disease are cardiovascular diseases (e.g., heart attacks and stroke), cancers, chronic respiratory diseases (e.g., chronic obstructed pulmonary disease and asthma) and diabetes (World Health Organization).

Communicable disease: Also known as infectious disease, is caused by pathogenic microorganisms, such as bacteria, viruses, parasites or fungi. Communicable diseases can be spread, directly or indirectly, from one person to another. Zoonotic diseases are infectious diseases of animals that can cause disease when transmitted to humans (World Health Organization).

Community kitchens: Also called collective kitchens, they are community-based cooking programs where small groups of people come together to prepare meals and take food home to their families. In a community kitchen every member contributes by planning, preparing, and cooking food. Community kitchens create opportunities for learning about the importance of healthy eating and developing the skills to prepare healthy and affordable meals (Community Kitchen's Best Practise Toolkit – Canada).

Connectivity: Refers to the directness of links and the density of connections in a transport network. A highly permeable network has many short links and intersections, and minimal dead-ends. As connectivity increases, travel distances decrease and route options increase, allowing more direct travel between destinations, and creating a more accessible and resilient transportation system (healthyplaces.org).

Densification: Facilitated sustainable settlement planning through efficient use of spatial resources including bulk service infrastructure, energy sources and a decreasing supply of well-situated land. It is a key strategy to mitigate urban sprawl on the periphery of established development, while accommodating demand proximal to existing economic opportunities and infrastructure (City of Johannesburg, South Africa).

Ecosystem services: Simply stated, the benefits people derive from ecosystems. Besides provisioning services or goods like food, wood and other raw materials, plants, animals, fungi and micro-organisms provide essential regulating services such as pollination of crops, prevention of soil erosion and water purification, and a vast array of cultural services, like recreation and a sense of place (International Union for Conservation of Nature).

Equity (in health): Exists when all people can reach their full health potential and are not disadvantaged from attaining it because of their race, ethnicity, religion, gender, age, social class, socioeconomic status, sexual orientation or other socially determined circumstance (National Collaborating Centre for Determinants of Health).

Food system: The whole array of activities, ranging from input distribution through on-farm production to marketing and processing, involved in producing and distributing food to both urban and rural consumers (Michigan State University – Department of Agricultural Economics).

Greenway: A corridor of undeveloped land preserved for recreational use or environmental protection (Webster Dictionary).

Infill development: Development that occurs in underutilized or undeveloped land in already developed urbanized areas, thereby "filling in" an unused part of a community (Resources for the Future – organization).

Mixed land use: Enables a variety of land uses including residential, commercial, and industrial to be co-located in an integrated way that supports sustainable forms of transport such as public transit, walking and cycling, and increases neighbourhood amenity. Mixed land use developments can enhance the economic vitality and perceived security of an area by increasing the number of people on the street and in public spaces (Smart Growth).

Morbidity: The incidence of illness in a population (diffen.com). Morbidity is typically used to quantify the burden of disease related to a specific illness, e.g., 'cardiovascular morbidity'.

Mortality: The incidence of death in a population (diffen.com). Mortality can refer to the overall death rate in a population (e.g., all-cause mortality), or death related to a specific illness (e.g., cardiovascular mortality).

Overcrowding: Living in housing that does not have enough bedrooms for the size and make-up of resident households, according to the National Occupancy Standard (Canada Mortgage and Housing Corporation).

Radon: Radon is a colourless, odourless radioactive gas that is formed naturally by the breakdown of uranium in soil, rock and water. As a gas, radon is slowly released from the ground, water, and some building materials that contain very small amounts of uranium, such as concrete, bricks, tiles and gyprock. Radon gas breaks down further to form additional radioactive particles called radon daughters, or "progeny" that can be breathed into the lungs (Health Canada).

Sprawl: Also known as urban sprawl, it is a development pattern characterized by the following features: low-density development with new growth appearing primarily on previously undeveloped or agricultural land; outward development at the city edge, in contrast to a process of densification within the city's existing boundaries; emphasis on separation of major land uses (residential, commercial, industrial) and on single-use development (in contrast to mixed-use development); and disconnected residential development where new subdivisions are not contiguous with each other or with the rest of the city (Alberta Health Services).

Urban heat island effect: Describes built up areas that are hotter than nearby rural areas. The annual mean air temperature of a city with 1 million people or more can be 1–3°C warmer than its surroundings. In the evening, the difference can be as high as 12°C. Heat islands can affect communities by increasing summertime peak energy demand, air conditioning costs, air pollution and greenhouse gas emissions, heat-related illness and mortality, and water quality (US Environmental Protection Agency).

Vulnerable populations: Vulnerable populations are those which have increased susceptibility to adverse health outcomes as a result of inequitable access to the resources needed to handle risks to health. Examples of vulnerable populations include: Aboriginal peoples, people living in poverty, immigrants and temporary workers, refugees, people with disabilities, and people who are gender and sexually diverse (Calgary Health Region).

Walkability: The extent to which the built environment supports and encourages walking by providing for pedestrian comfort and safety, connecting people with varied destinations within a reasonable amount of time and effort, and offering visual interest in journeys throughout the network (Journal of Aging and Physical Activity).