# Appendices: Integrating Health and Transportation in Canada

**November 2019**

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# TAC REPORT DOCUMENTATION FORM

**Title and Subtitle**
Appendices: Integrating Health and Transportation in Canada

| **Report Date**<br>November 2019 | **Coordinating Agency and Address**<br>Transportation Association of Canada<br>401-1111 Prince of Wales Drive<br>Ottawa, ON K2C 3T2 | **ITRD No.** |
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**Abstract**
Existing transportation systems have been traditionally designed primarily for motorized vehicles and goods movement. This exerts a significant influence on the way Canadians travel in their daily lives to the point where it increases their risk of numerous negative health outcomes.

The paradigm has begun to shift towards health-promoting transportation systems and environments. There is an opportunity to further build health considerations into transportation policies, planning, investment and design decisions. This report identifies the state of the practice, gaps, recommendations, and resources for strengthening the integration between health and transportation.

**Keywords**
Traffic and Transport Planning
- Accessibility
- Air pollution
- Cost Benefit Analysis
- Cycling
- Health
- Hospital
- Mental Illness
- Modal choice
- Multimodal mobility
- Noise Annoyance
- Safety
- Walking

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Regional Municipality of York

Ville de Montréal

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This document was prepared under the supervision of a Project Steering Committee of volunteer members. The participation of the committee members throughout the project is gratefully acknowledged.

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*Integrating Health and Transportation in* Canada was prepared on behalf of TAC by Urban Design 4 Health in association with Alta Planning + Design.

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# TABLE OF CONTENTS

# INTRODUCTION

This document provides the Appendices to the Transportation Association of Canada's *Integrating Health and Transportation in Canada* publication.

- Appendix A describes the methods used to complete the literature and best practices review.
- Appendix B details the methods used for the online survey and interviews.
- Appendix C provides a technical memo summarizing the methodology and findings from the two webinar sessions.
- Appendix D provides additional primary and secondary resources of interest.

# APPENDIX A: METHODS USED TO IDENTIFY LITERATURE AND BEST PRACTICES

## METHODS USED FOR THE LITERATURE REVIEW

The methods used to identify, review and organize the relevant literature for review are described below. Two types of resources were emphasized for review:

➢ **Peer-reviewed literature** meta-reviews on core topics published in recent years (e.g., between 2010 and 2017), articulating the "edge" of current scientific knowledge about transportation's role in multimodal safety, changing healthy behaviours, health risks from environmental exposures, and access to health promoting and medical services.

➢ **Best practices documents and guidance materials** identify existing and emerging national, provincial, local and international strategies used to integrate health considerations into transportation planning.

An initial list of documents for each category, identified through keyword searches (Table 1) of specific sources (Table 2), was provided to the TAC Project Steering Committee for input. The additional Project Steering Committee suggested resources were reviewed; some were incorporated into the text and all are found in the annotated bibliography.

**Table 1: Research Methods - Keyword Search**

| | |
|---|---|
| Transportation Geometric Design + multimodal safety | Active Transportation + Health |
| Transportation Infrastructure Design + multimodal safety | Active Transportation + Monetization |
| Transportation + Design + Guide | Active Transportation + Economic |
| Transportation + Health | Active Transportation + Injury |
| Transportation + Health + Tool | Bik* + Health |
| Transportation + Injury | Pedestrian + Health |
| Transportation + Mental Health | Walking + Health |
| Transportation + Public Health | Complete Streets + Guide |
| Transportation Programs | Healthy Development + Design |
| Transportation Demand Management Programs | Healthy Communities |
| Transportation Demand Management Policies | Healthy + Street |
| Active Transportation Encouragement Programs | Multimodal Safety + Guide |
| Active Transportation Policies | Multimodal Safety + Health |

**Table 2: Research Methods – Initial Sources Searched to Create Draft Resources List for TAC PSC Review**

| Type | Source |
|------|--------|
| Academic | Active Living Research |
| | Canadian Institutes of Health Research |
| | University of Washington Online Library |
| Consultant | Alta Planning + Design's Internal Health + Design Toolkit |
| | Urban Design 4 Health literature database |
| Government | Transport Canada |
| | National Cooperative Highway Research Program (NCHRP) |
| | Transportation Research Board |
| | U.S. Centers for Disease Control and Prevention Healthy Places |
| | U.S. Federal Highway Administration |
| Non-governmental Organization | Active Transportation Alliance |
| | Health Impact Assessments Database |
| | People for Bikes Statistics Library |
| | PEW Charitable Trusts |
| | Victoria Transport Policy Institute |
| | Vision Zero Database |
| | World Health Organization |
| Professional Association | American Association of State Highway and Transportation Officials (AASHTO) |
| | Association for Commuter Transportation |
| | Association of Commuter Transportation |
| | Canada Institute of Planners |
| | Canadian Urban Transit Association |
| | National Association of City Transportation Officials |
| | Ontario Professional Planners Institute |
| | Pedestrian & Bicycle Information Center |
| | Transportation Association of Canada (TAC) |

To effectively manage the review resources, resources were reviewed and summarized in a tiered manner.

- Primary: Resources anticipated to be the highest quality and incorporated into the text of this report were labeled "Primary." Judgment about highest quality balanced scientific merit (i.e., meta-analyses or systematic reviews), most recently published, and geographic applicability to prioritize Canadian-specific literature. In addition to being incorporated into this report, primary resources in the annotated bibliography also have two-three sentences indicating the main theme and findings of the resource.
- Secondary: Resources that did not rise to the top as primary resources were tracked by topic area and are included in the bibliography. Because of the volume of resources, those labeled secondary do not have annotation but are included to assist practitioners that need to do a more in-depth investigation of the subject as needed.

# APPENDIX B: STAKEHOLDER SURVEYS AND INTERVIEWS

The Consultant Team conducted a practitioner-focused survey and stakeholder interviews to gain insight into practitioner knowledge and needs in efforts to integrate health and transportation.

The online survey included both multiple choice and open-ended questions to inventory guiding resources and examples of integrated practice, gather practitioners' perceptions and weight of importance of integrated practice, and identify challenges and successes. The 410 survey respondents were prompted to prioritize seven evidence-based areas related to the intersection of health and transportation. The questions were aimed to engage both transportation and health practitioners.

The telephone-based interview consisted of eight open ended questions about the interviewees' experiences (efforts, challenges and successes) integrating health and transportation in their professional field. Of the 21 key stakeholders contacted for the survey, 19 were successfully interviewed.

## KEY FINDINGS

Regardless of primary field (health, transportation, both, other[3]), practitioners prioritized a need for more resources and knowledge in the following three factor areas - Travel Mode Choice & Active Transportation, followed by Safe Transportation Systems for all Modes, and Monetizing Health Outcomes Related to Travel Behaviour. When these priorities were analyzed by professional field, individuals working in health prioritized the need for resources and knowledge focused on Health Equity. In comparison, individuals working in transportation prioritized Safe Transportation Systems for All Modes. Each field ranked Travel Mode Choice & Active Transportation second.

After indicating which two of the seven areas needed the most improvement in resources and knowledge, participants were provided statements and asked them how well they agreed with them. The following key findings emerged from the analysis of their agreement and overlap with the findings from interviews:

- A strong desire for collaboration exists between practitioners of both fields, wanting to share a common language and develop cross-disciplinary understandings of benefits, processes, and rationales.
- Survey respondents conveyed a need to not only understand why the integration of health and transportation matters, but how to conduct evaluation on efforts geared towards such integration.
- Interviewees in both the health and transportation profession continually mentioned the need to shift the mentality from auto centric city building to city building for all modes.
- Survey respondents conveyed that transportation and land use decision makers do not adequately understand Health Equity and the Monetization of Health Outcomes Related to Travel Behavior. Additionally, interviewees expressed political representatives do not always have a strong understanding and knowledge base to support the efforts needed to integrate health into transportation.
- There is strong interest in having a data collection, metrics, and modeling framework to measure the health impacts of transportation projects, especially related to Monetizing Health Outcomes Related to Travel Behaviour and Reducing Exposure to Air Pollution and Noise Related to Transportation.

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[3] "Other" included municipal government, research or education, or consulting.

# SURVEY METHODS

The online survey included both multiple choice and open-ended questions to inventory guiding resources and examples of integrated practice, gather practitioners' perceptions and weight of importance of integrated practice, and identify challenges and successes. The questions were aimed to engage both transportation and health practitioners. Respondents were required to answer 19 of the 32 maximum questions. Logic or carry-forward response features were employed for select questions.

The online survey was promoted widely using TAC's email lists and newsletter, as well as professional networks (APBP, Canadian Institute of Transportation Engineers, Toronto Centre for Active Transportation, American Public Health Association, Pedestrian and Bicycle Information Centre, Ontario Professional Planners Institute, Canadian Institute of Planners, Share the Road Ontario, Green Communities Canada, and Canada Bikes) and social media accounts. The survey was further disseminated through email and cross postings by organizations and individual practitioners throughout the time it was open (May 10 through May 31, 2018).

The survey asked respondents a variety of questions related to their organizational and professional work. Organizational information collected included country/region, community types, levels of government, and province of practice; mission of agency or organization; and interdisciplinary hiring and training practices. Professional information collected included role, primary field, cross training, work foci, travel mode foci, educational background, and length of experience.

To better understand the integration of health and transportation in practice by individuals and organizations, the survey asked about the respondents' workplace primary mission and cross-field hiring or training practices. It solicited respondents to rank how well they perceive their workplace to integrate health and transportation.

Lastly, to inventory the needs and priorities of practitioners, the survey presented seven areas identified as key concepts at the intersection of health and transportation: Safe Multimodal Systems; Travel Mode Choice and Active Transportation; Transportation Access to Health Promoting Resources; Supporting Mental Health; Reducing Exposure to Air Pollution and Noise Related to Transportation; Health Equity; and Monetizing Health Outcomes Related to Travel Behaviour). Survey respondents were asked to select the top three factors they feel they need more resources and knowledge to better integrate health and transportation. Consecutively for each of the three factors the respondents selected as priorities, the survey led them through a series of level-of-agreement statements, from strongly agree to strongly disagree and don't know/not applicable. These statements ranged from whether individuals identified the factor as a transportation and/or health issue, is understood by select professional and political players, whether data collection efforts, scientific evidence, funding, and supporting policy exist, and if adequate training in various settings exist.

Across the responses received from all respondents averages were calculated per statement of agreement, attributing a sliding scale of values starting at 5 (Strongly Agree) and 1 (Strongly Disagree). Don't Know/Not Applicable was awarded a zero. These averages were calculated by statement and broken down by seven priority health and transportation factors assessed for this survey.

Individuals who completed the survey were asked to provide contact information if they would be willing to be an interviewee. These individuals were considered for interviews.

# INTERVIEW METHODS

The Project Steering Committee assisted in selecting 21 people for interviews to delve further into questions from the survey. The interviewees had all previously completed the survey and indicated at the end of the survey they were interested in participating in a follow-up interview. Of the 21 people contacted for the survey,

19 were successfully interviewed. The interview consisted of eight open ended questions about the interviewees' experiences integrating health and transportation in their professional field.

The interviews took place between June 7 and June 27, 2018 and took approximately 30-45 minutes each to complete.

The interview questions asked:

1. **What is the nature of your work? Please share how your role is related to transportation and/or health.** This question was asked in order to identify the professional field that each interviewee works in to assist in identifying discipline-based trends in the data.

2. **How are you, and the agency you work for, endeavoring to integrate health and transportation?** The purpose of this question was to get an idea of the ways the professionals across Canada are addressing the growing need for transportation and health integrated projects and policies.

3. **What challenges have you experienced in integrating health and transportation?** Indicating the challenges that interviewees have experienced in health and transportation integration provides opportunity to identify gaps in the current structure and identify trends across the disciplines.

4. **What successes have you experienced in integrating health and transportation?** Identifying the successes that interviewees have experienced in health and transportation integration helps to frame what policy and projects are working. This allows for recommendations to be made to encourage these types of efforts moving forward.

5. **What needs to happen from your perspective to in order to achieve more successful outcomes?** This question created an opportunity for open ended suggestions from educated and experienced professionals. This information is beneficial in identifying overarching themes and creative ideas for health and transportation integration.

6. **Where do you need more support in integrating health and transportation? What kind of support?** Asking interviewees where they would like to see more support in integrating health and transportation allows for direct recommendations to be made for improvements to the health and transportation integration framework.

7. **Who do you recognize as champions for including health in transportation -- people, agencies? Why? What do you see them doing well?** Identifying champions locally, nationally and internationally was a way to gather information on what interviewees believe are good examples and best practices. This creates a benchmark for comparison when analyzing Canadian examples, and provides a vetted set of good examples and best practices.

8. **How are you measuring performance when it comes to assessing short and/or long-term outcomes associated with transportation behaviour and infrastructure?** Answers to this question provides a sense of how professionals are measuring their short and long term performance when it comes to implementation of health and transportation projects.

# SURVEY ANALYSIS

The online survey resulted in 410 survey participants, predominantly who identified themselves as Canadian professionals.

## DEMOGRAPHICS OF SURVEY RESPONDENTS

Of the 410 survey respondents, the majority work in Canada (91%), specifically in the Province of Ontario (52%), and work in either transportation (41%) or health (34%) fields (Figure B1). Individuals who work from outside of Canada work in the United States (8%) or elsewhere (1%), such as in New Zealand and Pakistan. Most Canadian respondents (N = 374) work in Ontario (52%), followed by British Columbia (11%), Alberta (10%), and Nova Scotia (7%) (Figure B2). No responses were obtained from individuals in Newfoundland and Labrador, Prince Edward Island, and the Territories.

What is your **agency/organization's** primary mission/function/purpose? (N = 410)
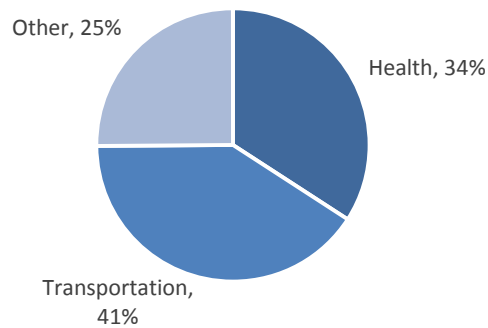


Other, 25%

Health, 34%

Transportation, 41%

**Figure B1: Survey Respondent's Workplace's Primary Purpose or Mission**

## Canadian Province or Territory
### (N = 374)

British Columbia
11%

Alberta
10%

Nova Scotia
7%

Manitoba
6%

New Brunswick
6%

Quebec
4%
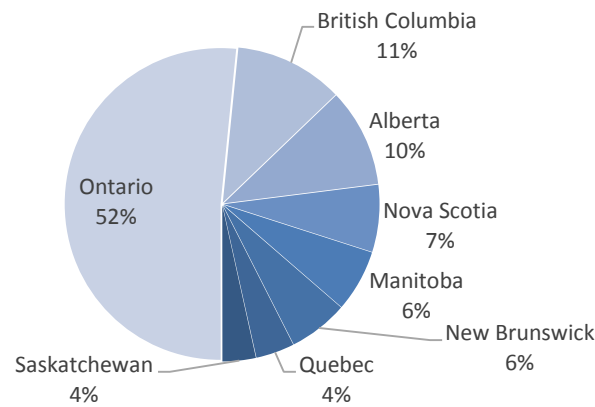
Saskatchewan
4%

Ontario
52%

**Figure B2: Province or Territory of Canadian Respondents**

Those who identified "other" commonly noted municipal or regional government or services, education, infrastructure, or social services. In comparison, survey respondents' primary professional fields were skewed more towards transportation (48%), rather than health (34%), with fewer individuals indicating they work in both health and transportation (9%).

Survey respondents were asked to identify all the levels of government in which they practice. The majority of respondents work at the municipal level (64%), followed by regional (45%) and provincial/state (44%). The fewest respondents work at the national level (14%). The respondents work at organizations that serve a relatively even distribution of urban, suburban, small town and rural communities (Figure B3). 87% of respondents indicated that their organization's primary level of practice is at more than one of the types of communities.

## Please indicate the primary level(s) of your agency/organization's practice and/or the type of communities the agency serves.
### (Check all that apply, N = 410)



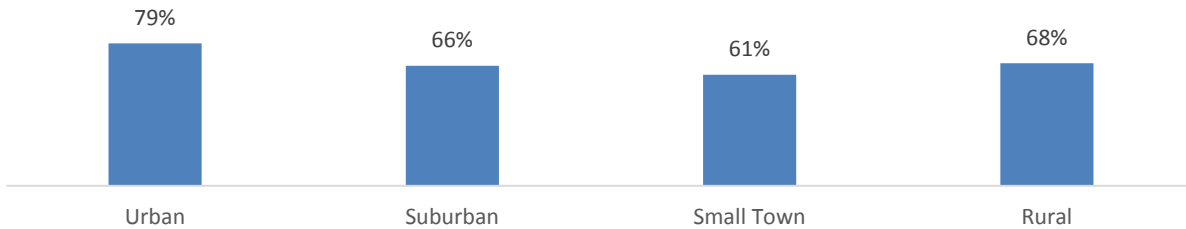| Urban | Suburban | Small Town | Rural |
| 79% | 66% | 61% | 68% |

**Figure B3: Community Types Served by Respondents**

Survey respondents represent varying professional roles and sub-fields within health and transportation. The majority of survey respondents identified themselves as technical staff (43%), followed by other (30%), managers (26%), citizens (1%), and elected officials (0.5%). Of those who marked "other," public health professionals such as public health nurses, health promoters, and health specialists were most common (27% of those who marked "Other", 8% of total respondents), followed by students, researchers, and program coordinators. Respondent's current roles were diverse, with the majority involved in planning (57%), public engagement (50%), research and evaluation (44%), and policy making (40%) (Figure B4).

## How would you describe your current role in health or transportation?
### (Check all that apply, N = 372)



Planning 57%, Public engagement 49%, Research/evaluation 44%, Policy making 40%, Project management 38%, Health promotion 36%, Engineering 31%, Education 25%, Design 25%, Data analyst 23%, Programmatic 13%, Other 12%, Epidemiologist 3%
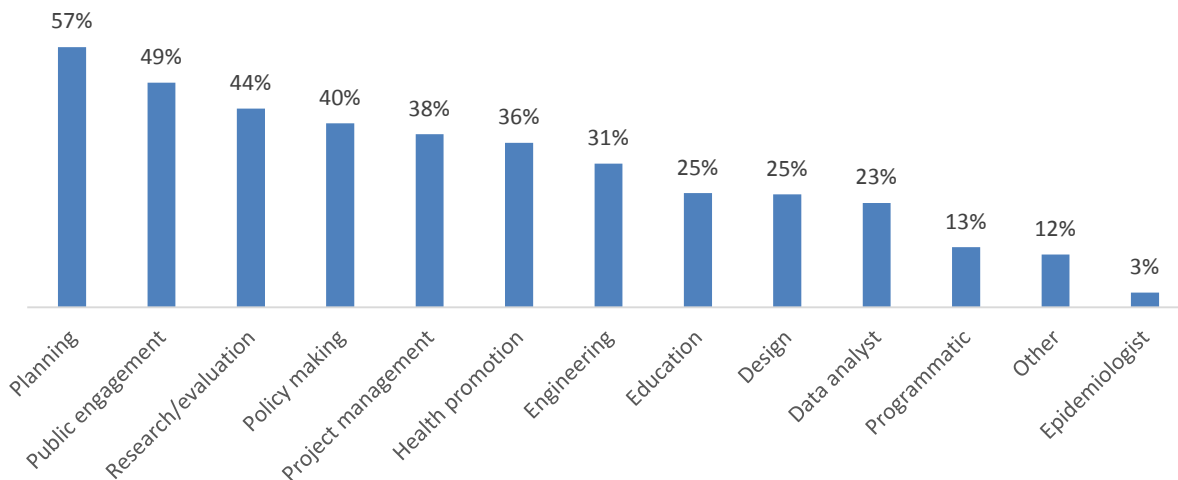
**Figure B4: Professional Roles of Respondents**

The travel modes respondents predominately work with included cycling (72%), walking (70%), public transit (60%), and private vehicles (gasoline/diesel 52%, electric 34%) (Figure B5).

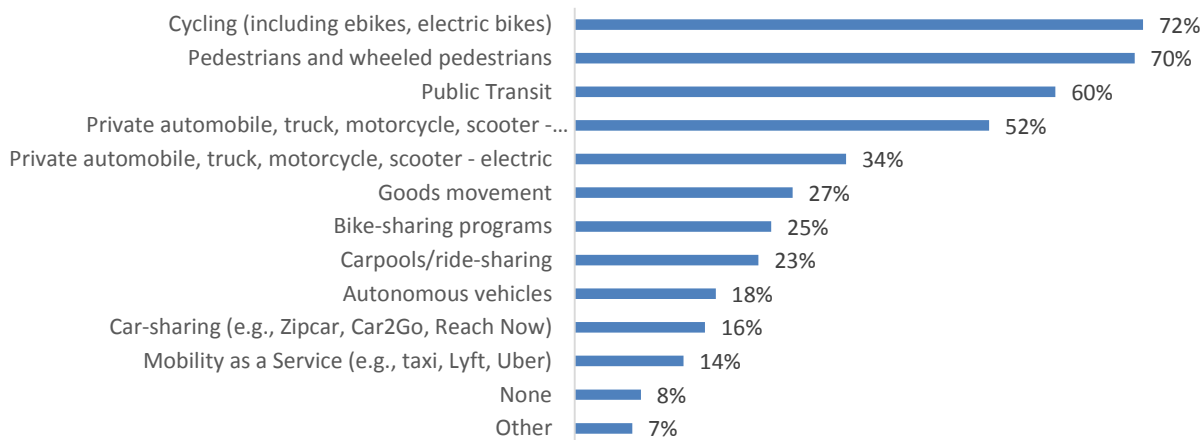**As part of your professional role, which travel modes do you work with? (Check all that apply, N = 372)**

| Travel Mode | Percentage |
|---|---|
| Cycling (including ebikes, electric bikes) | 72% |
| Pedestrians and wheeled pedestrians | 70% |
| Public Transit | 60% |
| Private automobile, truck, motorcycle, scooter -… | 52% |
| Private automobile, truck, motorcycle, scooter - electric | 34% |
| Goods movement | 27% |
| Bike-sharing programs | 25% |
| Carpools/ride-sharing | 23% |
| Autonomous vehicles | 18% |
| Car-sharing (e.g., Zipcar, Car2Go, Reach Now) | 16% |
| Mobility as a Service (e.g., taxi, Lyft, Uber) | 14% |
| None | 8% |
| Other | 7% |

**Figure B5: Travel Modes of Professional Focus**

Regarding respondents' professional and educational background, over 55% of respondents have been working in health or transportation for 11 or more years, whereas 19% have worked between 6 to 10 years, 17% between 3 to 5 years, and 8% 1 to 2 years. Educational backgrounds varied, with the majority of individuals having bachelors in transportation or engineering (23%), followed by a bachelor's in health or health related discipline (22%), graduate degree in planning (13%), and graduate degree in public health (12%).

In summary, the majority of survey respondents were Canadian, specifically working in Ontario as transportation professionals working either in health or transportation for 11 or more years. Planning, public engagement, and research areas of practice were highly represented, as were cycling, walking, and transit modes.

## HEALTH + TRANSPORTATION INTEGRATION

The survey aimed to understand how much cross training, hiring, and integration between health and transportation occurs among those agencies represented by survey respondents. Based on the respondent's answer to the primary role of their organization or agency, the survey asked if their place of work had hired or trained someone with experience in the other field. Of individuals whose workplace primarily focuses on health, 39% of individuals noted their workplace has hired individuals in transportation, while 38% noted their workplace has not, and 22% were unsure (Figure B6). Comparatively, of individuals whose workplace primarily focuses on transportation, 21% of individuals noted their workplace has hired individuals in health, 55% noted the opposite and 24% were unsure (Figure B6).
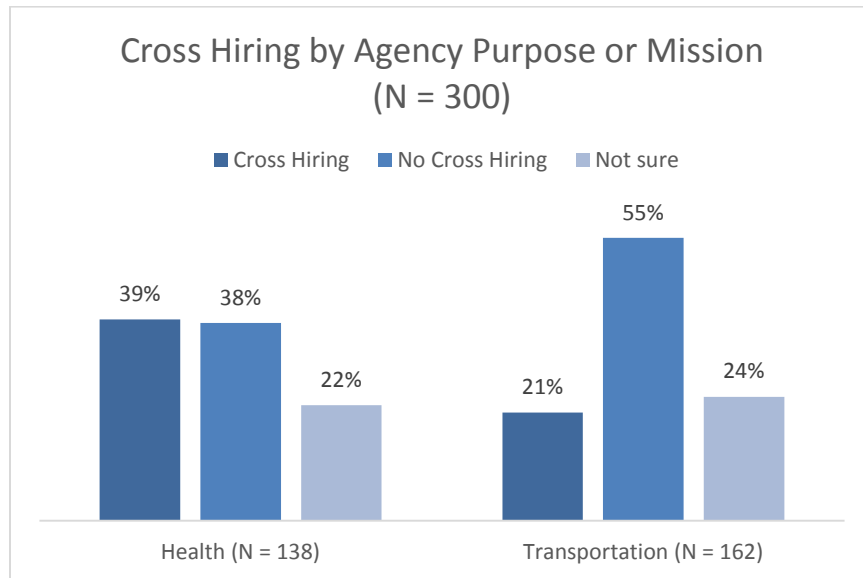
**Cross Hiring by Agency Purpose or Mission**
**(N = 300)**

■ Cross Hiring  ■ No Cross Hiring  ■ Not sure

Health (N = 138): 39%, 38%, 22%
Transportation (N = 162): 21%, 55%, 24%

**Figure B6: Hiring Practices by Agency Primary Role**

The survey shows a similar dynamic among cross-training experience at the individual professional level, where more individuals working in health have cross training in transportation (32%), as compared to those working in transportation (25%) (Figure B7).
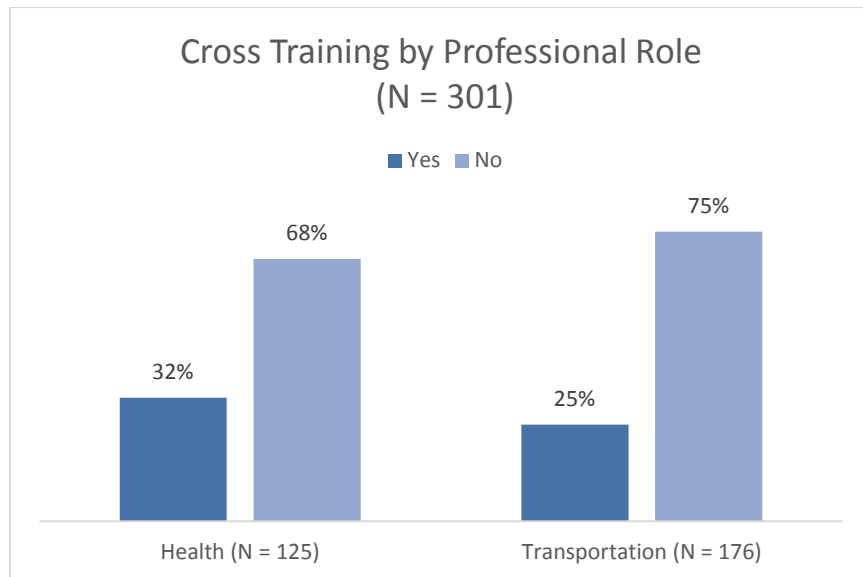
**Cross Training by Professional Role**
**(N = 301)**

■ Yes  ■ No

Health (N = 125): 32%, 68%
Transportation (N = 176): 25%, 75%

**Figure B7: Cross Training Experiences by Professional Field**

Individuals were asked a Likert scale question soliciting how well they perceived their workplace to integrate health and transportation routinely (no definition, examples, or qualifications of integration were given). A third of all survey respondents indicated their agencies moderately integrate health and transportation (33%). Nearly a fifth (18%) indicated their agencies did not routinely integrate health and transportation well and 8% indicated they did so well. When respondents are grouped by their workplace's purpose or mission (health or transportation), marginally more individuals working for health-related organizations feel their organizations integrate health and transportation moderately well or better (57%), compared to those working for

transportation focused organizations (54%) (Figure B8).

On a scale of 1 to 5 (1 = NOT well integrated, and 5 = well integrated), how well do you think your agency routinely integrates health and transportation? (N= 278)
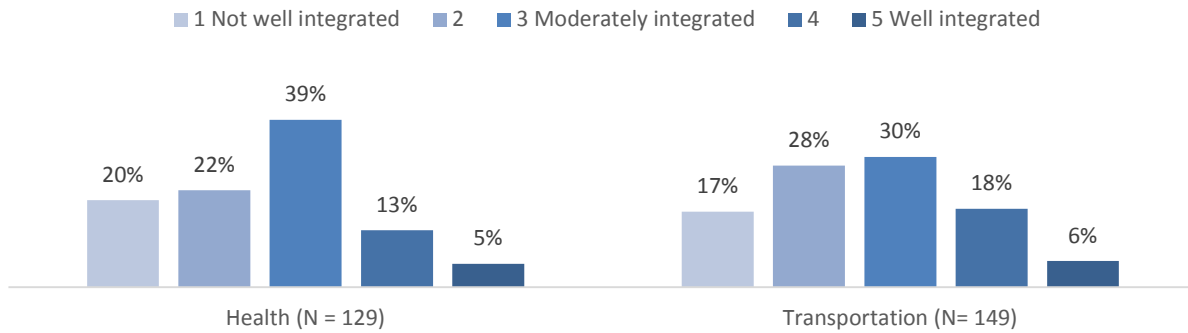
■ 1 Not well integrated ■ 2 ■ 3 Moderately integrated ■ 4 ■ 5 Well integrated

**Figure B8: Perception of Routine Workplace Integration of Health and Transportation**

## PRIORITY AREAS FOR KNOWLEDGE AND RESOURCE DEVELOPMENT

To better support practitioners in integrating health and transportation, respondents were asked to prioritize for which factors they need additional knowledge and resources most.[4] The highest needs are for (1) Travel Mode Choice & Active Transportation, followed by (2) Safe Transportation Systems for All Modes, and (3) Monetizing Health Outcomes Related to Travel Behaviour (Figure B9). Other areas self-identified in respondent comments included impact of accessible transportation, access to healthcare services, climate change initiatives (traffic-related air pollution mitigation measures), and better data and measures for modeling (such as monetization and traffic modeling). For those alluding to accessible transportation in the open ended "Other" response, individuals commonly mentioned making transportation services more physically and financially accessible for youth, seniors, and those living in rural communities, in addition to making it more affordable for all.

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[4] The factors included: Safe Multimodal Systems, Travel Mode Choice and Active Transportation, Transportation Access to Health Promoting Resources, Supporting Mental Health, Reducing Exposure to Air Pollution and Noise Related to Transportation, Health Equity, and Monetizing Health Outcomes Related to Travel Behaviour

## Areas of Needed Knowledge and Resources - All professions (N = 344)

■ Top Choice  ■ Second Choice  ■ Third Choice

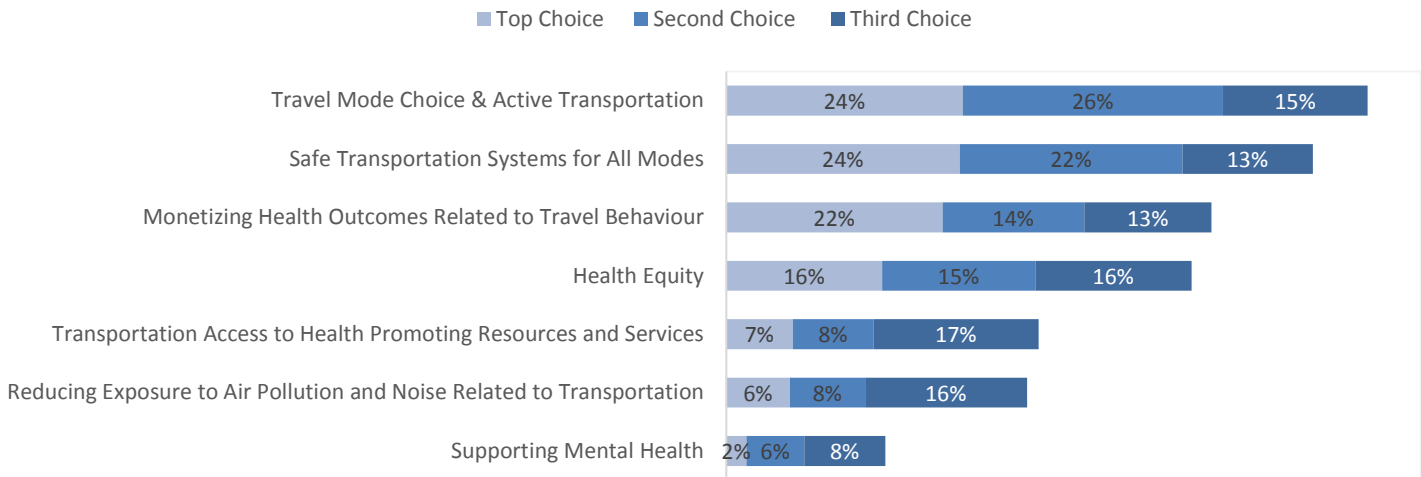| Category | Top Choice | Second Choice | Third Choice |
|---|---|---|---|
| Travel Mode Choice & Active Transportation | 24% | 26% | 15% |
| Safe Transportation Systems for All Modes | 24% | 22% | 13% |
| Monetizing Health Outcomes Related to Travel Behaviour | 22% | 14% | 13% |
| Health Equity | 16% | 15% | 16% |
| Transportation Access to Health Promoting Resources and Services | 7% | 8% | 17% |
| Reducing Exposure to Air Pollution and Noise Related to Transportation | 6% | 8% | 16% |
| Supporting Mental Health | 2% | 6% | 8% |

**Figure B9: Practitioner Priority Areas for Knowledge and Resources to Support the Integration of Health + Transportation**

Respondents who worked in health versus transportation had differing resource and knowledge top choice priorities, but those priorities remained consistent regardless of their professional role or organization's purpose or mission. Individuals working for health-focused agencies prioritized Health Equity, while individuals working for transportation-focused agencies prioritized Safe Systems for All Modes (Figure B10). Both of these priority areas were followed by Travel Mode Choice & Active Transportation.

## First Choice Factor Selected by Agency Mission or Purpose
### (N = 270)

Health (N = 125): 23%, 15%, 14%, 30%, 10%, 6%, 2%
Transportation (N = 145): 26%, 30%, 25%, 6%, 7%, 3%, 2%

Legend:
■ Travel Mode Choice & Active Transportation
■ Safe Transportation Systems for All Modes
■ Monetizing Health Outcomes Related to Travel Behaviour
■ Health Equity
■ Reducing Exposure to Air Pollution and Noise Related to Transportation
■ Transportation Access to Health Promoting Resources and Services
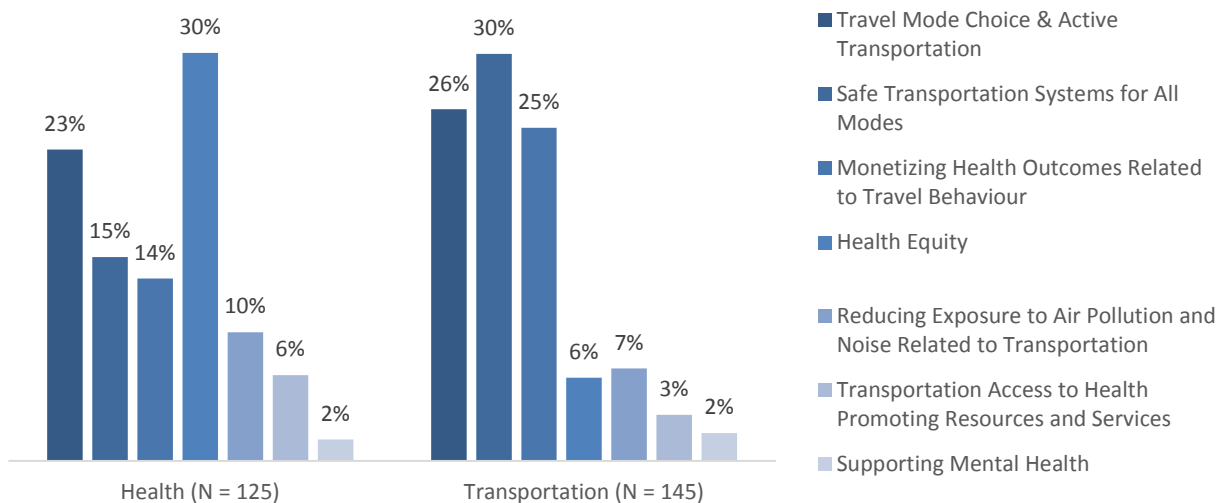■ Supporting Mental Health

**Figure B10: Priority Ranking by Agency Mission or Purpose**

When analyzing trends in the top three selected factors, health related professionals and those identifying themselves as working in "Both" fields ranked Health Equity as the area needing the most resources and knowledge development, whereas transportation professionals ranked Safe Transportation Systems for All Modes the highest (Figure B11).
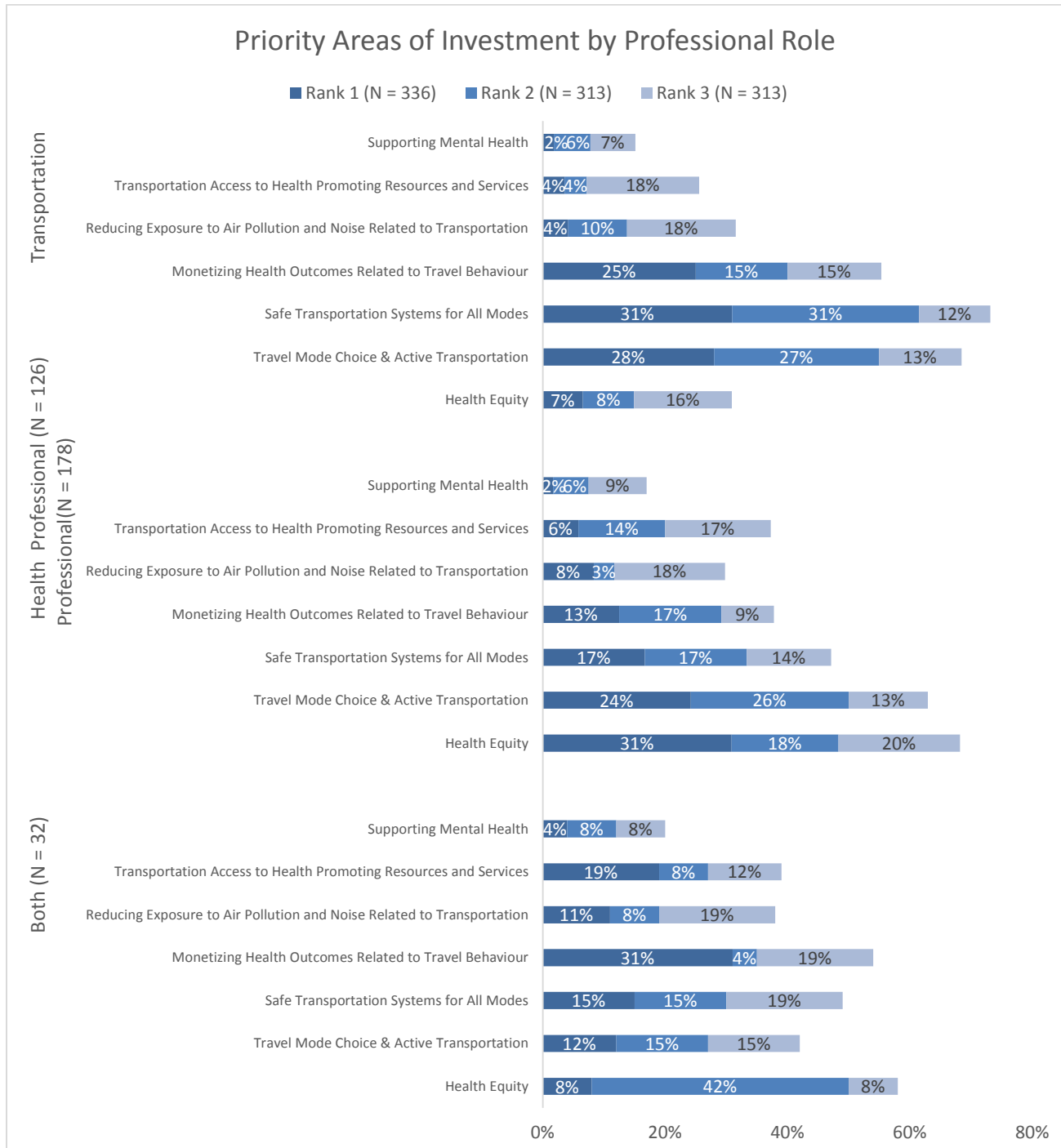


**Figure B11: Priority Ranking by Professional Role**

# INTERVIEW ANALYSIS

This section provides a summary review of the information gathered through telephone-based interviews with 19 people. The interview consisted of eight open ended questions about the interviewees experience integrating health and transportation in their professional field.

## DEMOGRAPHIC INFORMATION OF SURVEY INTERVIEWEES

All of the interviewees selected were from Canada. Figure B12 shows the Province that each interviewee is working in. Prince Edward Island and Newfoundland had no representation in the interviews. Ontario had the greatest representation at 26%. One individual worked for the federal government therefore did not fit into any of the categories.
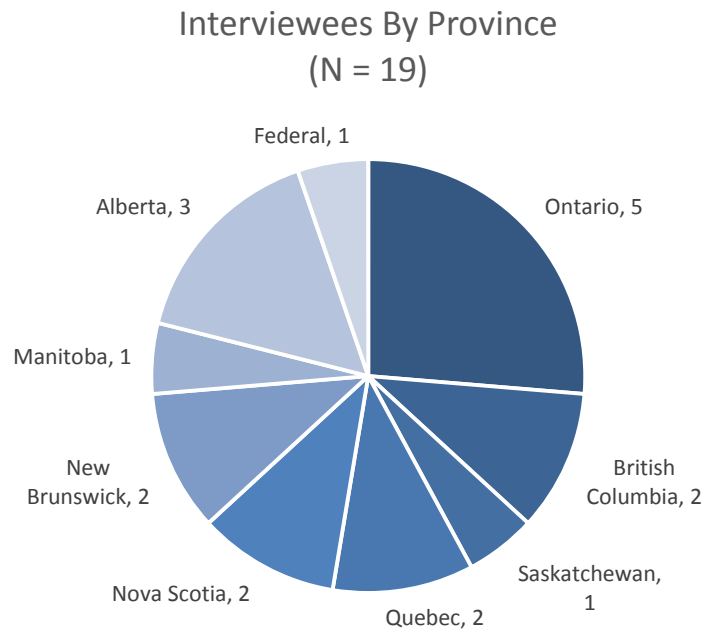


**Figure B12: Representation of Stakeholder Interview Group**

Identifying the interviewee's professional field, employment sector and community type help to explore commonalities and to determine trends in each discipline. Having this demographic information gives a better sense of the area or discipline specific challenges and successes that health and transportation professionals across Canada are experiencing.

There is a slightly greater representation from the health field. There were 11 professionals from the health field interviewed and eight from the transportation field. Note that the two people who were not interviewed due to unsuccessful scheduling were professionals in the transportation field.

The majority of the people selected to be interviewed were from the public sector (84 %). The public sector includes government employees at federal, provincial and municipal levels as well as non-profit groups that are funded by the government. Private sector includes university researchers/professors and consultants.
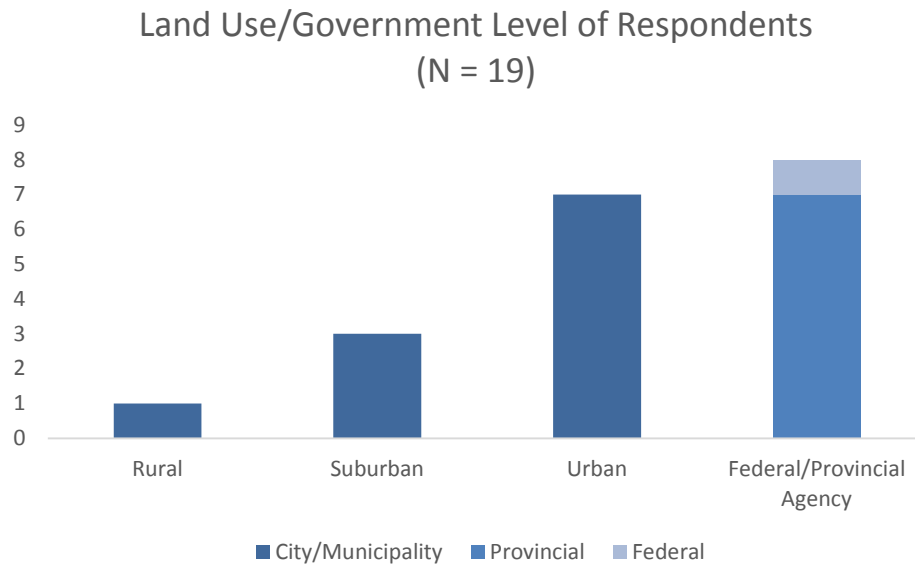
## Land Use/Government Level of Respondents
### (N = 19)



Legend: ■ City/Municipality  ■ Provincial  ■ Federal

**Figure B13. Community Types Served by Stakeholder Interviewees**

The community type for each interviewee was recorded in order to get an idea of specific health and transportation related challenges and successes for certain development densities (Figure B13). A number of interviewees did not fit into community types because they work for either provincial or federal government agencies, even so they did speak to a number of challenges in both the urban and rural settings across Canada and in the provinces.

## SUMMARY OF KEY INTERVIEW THEMES

### NEEDED NEXT STEPS AND SUPPORT

This section explores the overarching themes prevalent throughout the interviews. Responses are summarized below to these interview questions:

- *What needs to happen from your perspective to achieve more successful outcomes?*
- *Where do you need more support in integrating health and transportation? What kind of support?*

The most common theme, mentioned in 90% of the interviews, was the idea of a paradigm shift.

> *Interviewees in both the health and transportation profession continually mentioned the need to shift the mentality from auto centric city building to city building for all modes.*

Another key theme mentioned by 60% of interviewees (half from health, half from transportation) was a need for uniform language across the disciplines. Interviewees indicated that measuring successes and comparing data across different cities and regions would be easier if consistent naming conventions were used. A national resource that contained guidelines and a consistent naming convention were identified as possible solutions to this gap.

Transportation professionals mentioned in five of the eight interviews that there was a need to hold political representatives accountable for plans and policies that are passed in previous terms. It was suggested that a new city council can too easily reverse the action of previous council even with evidence presented from staff. Interviewees saw this as a gap in the progress of integrating health and transportation because it creates inconsistency in expectations from staff.

Health professionals mentioned in seven of 11 interviews that health needed to be recognized as a required stakeholder in all transportation projects. The four interviewees that did not mention being a stakeholder in projects felt recognized as a stakeholder and were already well integrated into transportation projects.

In both health and transportation there was interest from 70% of interviewees to have consistent policy from the national down to the municipal level. This would help guide municipalities, towns and cities through the process of successfully integrating health considerations into transportation projects. Interviewees indicated that the *Geometric Design Guide for Canadian Roads* from TAC[5] was an already frequently sourced document and something similar to that for health and transportation would be a useful tool.

The final overarching theme that was brought up in 80% of interviews was the need for funding. Health and transportation professionals discussed the need for dedicated funding from the province as well as from municipalities. The application of funding support is discussed in the challenges and integration section of the interview.

The following paragraphs discuss the trends within the answers of the interviews and explore the relationship between health and transportation professionals across Canada.

## ENDEAVOURING TO INTEGRATE HEALTH AND TRANSPORTATION

Responses are summarized below to this interview question:

- *How are you, and the agency you work for, endeavoring to integrate health and transportation?*

Interviewees were asked how their agency or workplace is integrating or working to integrate health and transportation. The chart below (Figure B14) represents the common ways in which interviewees are working within the two disciplines. Professionals in both disciplines are participating in research and creating policy and plans for transportation and health. Only interviewees in the health field said they were working directly with communities and members of the community on health and transportation projects, while only transportation professionals said they worked on construction projects as an example of health and transportation integration. Interviewees from both disciplines mentioned that they were members (either as staff members or volunteer community members) of health or transportation related committees, such as the cycling committee, the transportation committee and the planning committee.

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[5] http://www.tac-atc.ca/en/publications-and-resources/geometric-design-guide-canadian-roads

## Ways Interviewees Work to Integrate Health and Transportation (N = 19)

Policy writing: Health 7, Transportation 5
Committee Member: Health 5, Transportation 3
Research: Health 4, Transportation 3
Client/resident facing work: Health 4
Construction projects: Transportation 3
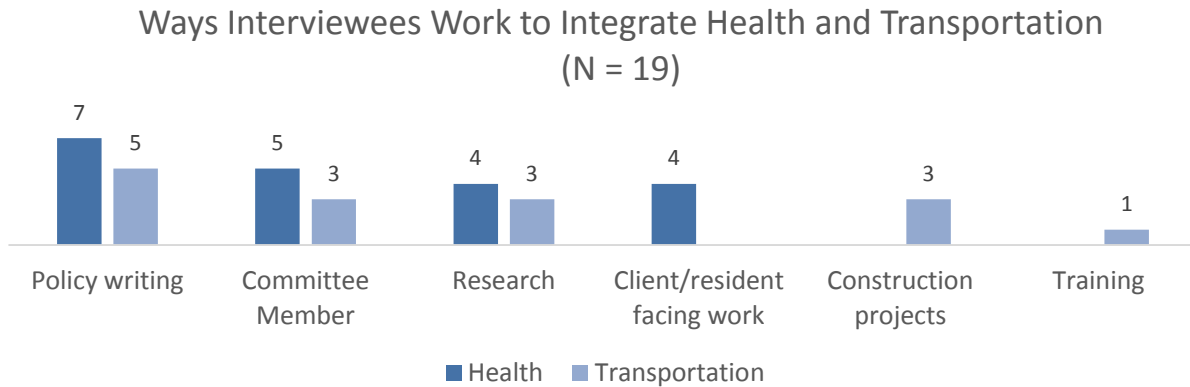Training: Transportation 1

■ Health  ■ Transportation

**Figure B14: Interviewee Effort s to Integrate Health and Transportation**

**CHALLENGES**

Responses are summarized below to this interview question:

- *What challenges have you experienced in integrating health and transportation?*

The types of challenges that were mentioned in the interviews are consistent with the answers for 'needed next steps and support' question asked in the interview. The overarching theme again was the need for a shift from auto-centric thinking to planning communities for all modes of transportation. Figure B15 outlines some of the common themes interviewees mentioned. Access to funding was mentioned by seven of the 19 interviewees. It was also mentioned that funding for active transportation projects often had to be taken from another budget instead of having a dedicated budget. The other most common challenge mentioned by interviewees was the unpredictability of the political framework that is present in the provincial and municipal environment. Interviewees discussed the difficulty of implementing long range plans and securing funding due to the change in government every four years.

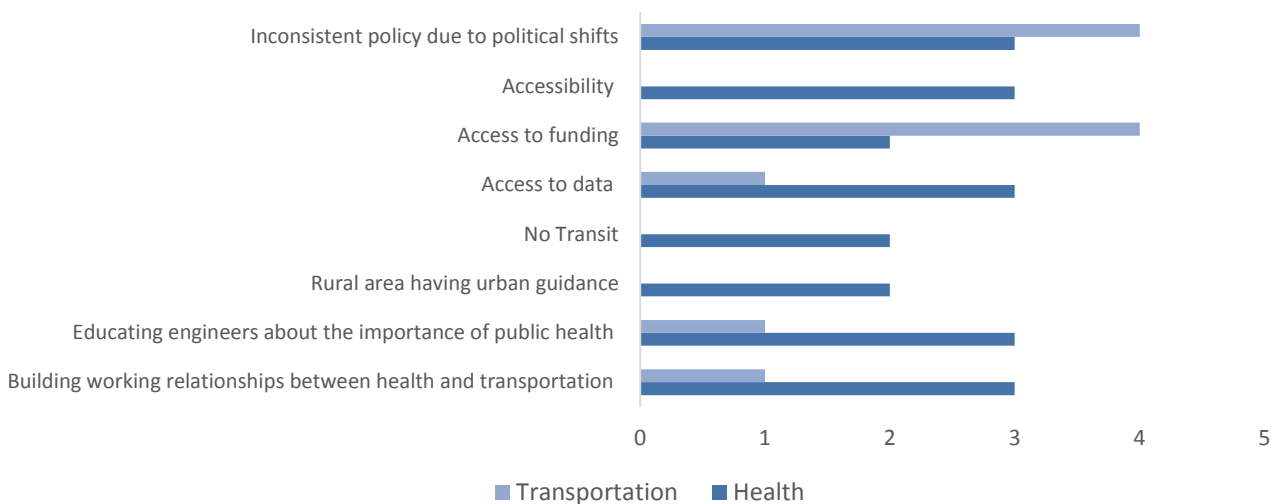## Challenges Integrating Health and Transportation (N = 19)

Inconsistent policy due to political shifts: Transportation 4, Health 3
Accessibility: Health 3
Access to funding: Transportation 4, Health 2
Access to data: Transportation 1, Health 3
No Transit: Health 2
Rural area having urban guidance: Health 2
Educating engineers about the importance of public health: Transportation 1, Health 3
Building working relationships between health and transportation: Transportation 1, Health 3

■ Transportation  ■ Health

**Figure B15: Interviewee Perceived Challenges in Health and Transportation Integration**

## SUCCESSES

Responses are summarized below to this interview question:

- *What successes have you experienced in integrating health and transportation?*

The most common success that health and transportation professionals identified is in plan and policy adoption. Success in getting Transportation Master Plans and Official Plans to reference health was mentioned by five transportation professionals and three health professionals. For example, due to the involvement of public health and active transportation professionals in the development of the five-year road plan in Haliburton County, it requires that all new road resurfacing must include a paved shoulder. Health professionals listed "getting a seat at the table" as a success as they continue to develop relationships with transportation departments and become recognized as an important area of planning. An example of this is planning and transportation applications being circulated to public health staff as they make their way through the approval process. In general there were more dynamic responses from those working in the health field when it came discussing successes in integrating health and transportation.

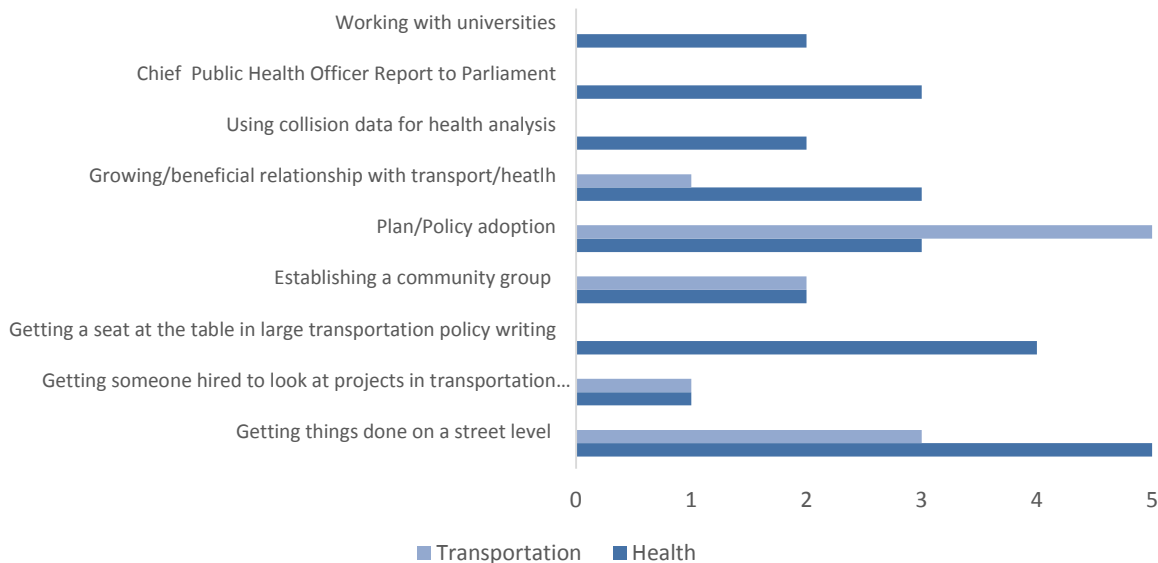### Successes Integrating Health and Transportation (N = 19)



**Figure B16: Interviewees Successes in Health and Transportation Integration**

## RECOGNIZED HEALTH AND TRANSPORTATION INTEGRATION CHAMPIONS

Responses are summarized below to this interview question:

- *Who do you recognize as champions for including health in transportation -- people, agencies? Why? What do you see them doing well?*

The word cloud in Figure B17 is a visual representation of the champions and best examples identified by interviewees. The identified champions and best examples ranged from plans and policies, to individual persons, to municipalities, and provinces. The mentioned champions were common in answers from both transportation and health professionals. The champions listed are examples of both national and international places or organizations.

The size of the text is a reflection of the number of times each champion was mentioned throughout the 19 interviews. Non-government agencies/not for profit agencies and community groups were the most common champion mentioned by 12 of the 19 interviewees. Both health and transportation professionals recognized the need for champions at a community level and some interviewees mentioned champions at a political level. Peel Region was mentioned as a champion by six interviewees for their development and execution of transportation projects through a health lens with a full-time position dedicated to the work. One interviewee stated that there are no national champions for health and transportation integration because even though we have the information of what needs to be done, no one has done it.



**Figure B17: Champions of Health and Integration Word Cloud (N = 19)**

## PERFORMANCE MEASURES

Responses are summarized below to this interview question:

- *How are you measuring performance when it comes to assessing short and/or long term outcomes associated with transportation behaviour and infrastructure?*

The performance measure most commonly used by both transportation and health professionals in regards to measuring success of transportation and health projects was collision analytics. This is a tangible measure that can be used to measure the safety of a road project by monitoring the increase or decrease in collisions or seriousness of collisions in a project area. The second most mentioned performance indicator was usage statistics. Usage statistics after a project has been implemented is a tangible measure for the success of a project (for instance, an increased number of bicyclists on a separated path project interpreted as success). A number of health professionals mentioned that it is difficult to measure long range health impacts of transportation projects because there are so many variables in individual health.

Another common theme was the lack of performance measures that were used or done after a project implementation, citing lack of budget or lack of resources as the reasoning.

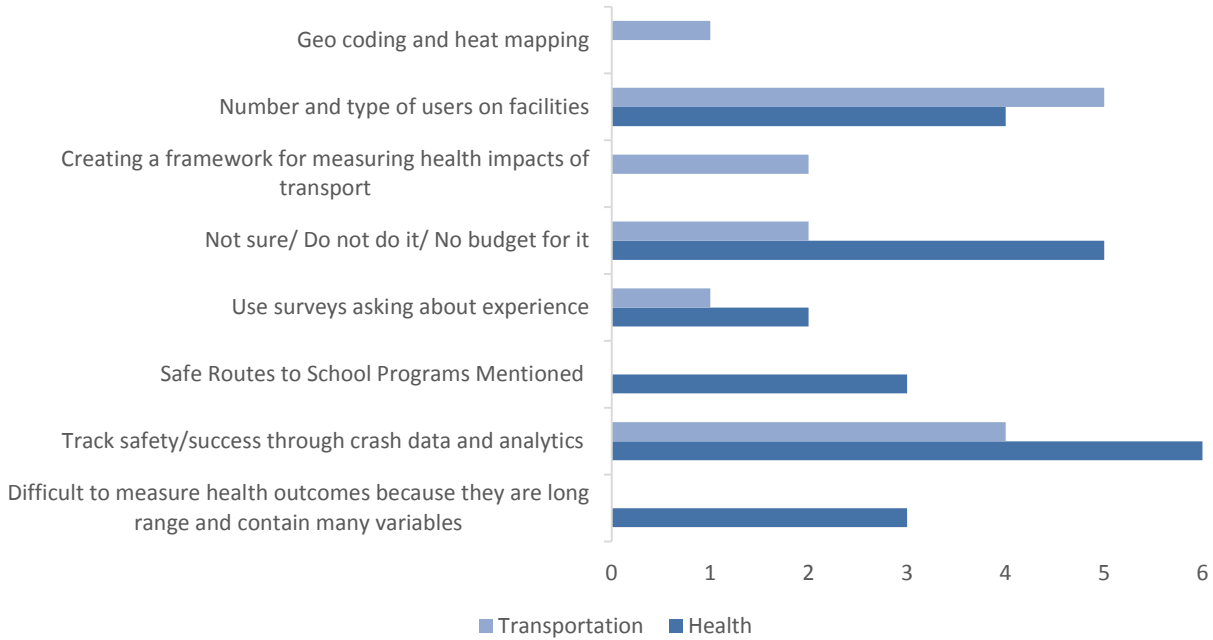## Performance Measures for Health and Transportation Endeavours (N = 19)



**Figure B18: Performance Measures Used for Integration of Health and Transportation**

# APPENDIX C: SUMMARY OF WEBINARS

This section provides a summary of the two nearly-identical webinars held on Thursday, November 1 and Tuesday, November 6, 2018. The webinars were held to gather stakeholder input on the draft recommendations regarding the key work that needs to be done to better integrate health and transportation in Canada. The webinars utilized interactive polling and open ended commenting to solicit stakeholder feedback on each of the eleven draft recommendations.

## STAKEHOLDERS

The two webinars drew a total of 86 viewers. The majority of the viewers participated in the polls. Participation did vary by poll with response rates fluctuating between 48% - 70% of the people viewing the webinar. Of those who participated in the first poll conveying professional practice and work location, 30% identified their primary profession in Transportation, 57% in Health, and 13% as both (N = 53).

All participating individuals conveyed they work in Canada, the majority of whom are located in Ontario (68%), followed by British Columbia (10%), Alberta (8%), New Brunswick or Nova Scotia (6%), Saskatchewan or Manitoba (6%), and Quebec (2%). No other provinces, territories, or other countries were represented.

## LOGISTICS & METHODS

The Consultant Team encouraged webinar interaction using polling and the comment box, sharing out the results of each poll such that all participants could see how their peers responded and encouraging commenters to keep their comments public in the chat box to all participants. Polling and comment box data was recorded during the webinars.

The webinars began with a poll asking webinar participants to identify their primary field and their work location. These primarily single choice questions asked (below) allowed the Consultant Team to better understand the professional and geographic demographics of who attended.

- In your professional practice, which one of these do you consider your primary field? Answer choices: Transportation, Health, Both, Other
- Where do you work? Answer choices: British Columbia, Alberta, Manitoba/Saskatchewan, Ontario, Quebec, New Brunswick/Nova Scotia/ Prince Edward Island/ Newfoundland and Labrador, Northwest Territories/Yukon, Nunavut, United States, Other

Sequential polling related specifically to the recommendations was used. For each of the eleven draft recommendations, the participants responded to three questions:

- How important do you feel this recommendation is to better integrate health and transportation? Answer choices: Important, Neutral, Not important, No Opinion
- Do you have any concerns about this recommendation? Answer choices: Yes, No, Neutral
- If you have concerns, how could this recommendation be improved? Answer choices: No concern, Concern noted in the chat box.

# APPENDIX D: PRIMARY AND SECONDARY RESOURCES

## INSTITUTIONALIZATION AND POLICY – PRIMARY RESOURCES

Chapman, J., et al. (2014, October). Healthy Streets: Design Features and Benefits. Toronto, ON, Toronto Public Health. from https://www1.toronto.ca/City Of Toronto/Toronto Public Health/Healthy Public Policy/Built Environment/Files/pdf/C/HealthyStreetsDesignFeaturesBenefitsWeb.pdf.
> This report highlights the health evidence and experiences of other cities as they shifted their focus from moving cars to moving people. It provides case studies, drawings and photos to illustrate how urban design can influence health. It focuses on three paths of influence:  1. Improve Accessibility  2. Ensure Safety and Security   3. Enhance the Experience

City of Vancouver (2012). Transportation 2040, City

Health Impact Project (2015). "Health Impact Assessments in the U.S.: Data Visualization." Retrieved March 2018, from http://www.pewtrusts.org/en/multimedia/data-visualizations/2015/hia-map#sector:Transportation
> Online database of HIAs funded by Health Impact Project (HIP, a joint project of the Pew Charitable Trusts and Robert Wood Johnson Foundation) and other funders. The database can be restricted to 83 transportation HIAs.

Ingram, J., et al. (2013, December). Healthy Communities: Legislative Comparison Survey Report. Ottawa. from https://www.cip-icu.ca/Files/Healthy-Communities/CIP-Legislative-Comparison-Survey-Report_20131217.aspx.
> This study shows that provincial level legislative, policy, and administrative structures vary widely in their support for the ways in which planners can create healthy built environments. The researchers conducted a survey and follow-up interviews of 15 Canadian Institute of Planners members to do this. The report details structures by provinces and provides municipalities of Vancouver.
> The City of Vancouver aims to have a 'smart and efficient' transportation system to support the economy, affordability, health, and natural environment of the City. The Transportation 2040 plan delivers a long-term strategic vision for the city to guide public investments, transportation decisions and land use. It sets long-term targets and high-level policies paired with specific actions to achieve the vision. Walking is the top priority.

Center for Environmental Excellence (2015, February). Transportation and Public Health: Peer Exchange Summary and Key Findings. from http://environment.transportation.org/pdf/2015_trans_health_exchange/transportation_and_public_health_white_paper_1214.pdf.
> This report provides general and AASHTO-specific recommendations on how to advance the integration of public health into transportation practice. It provides some key actions for transportation practitioners to consider.

Gelinne, D., et al. (2017, August). How to Develop a Pedestrian and Bicycle Safety Action Plan. Washington D.C., United State Department of Transportation: Federal Highway Administration.
> This high-level guide offers a framework to develop and implement safety action plans to improve cycling and walking conditions. It is geared towards State and local officials and contains links to and overviews of guidelines and best practices.l case studies on healthy community by design.

Jones, P. and K. Lucas (2012). "The social consequences of transport decision-making: clarifying concepts, synthesizing knowledge and assessing implications." Journal of Transport Geography 21: 4-16.

> This literature review aims to clarify, distinguish, and advocate for including social impacts of transportation in policy making. Social impacts are categorized in terms of health, justice, and individual and community wellbeing and social equity. The authors demonstrate that overlooking these impacts in the transportation decision-making process can undermine the quality of life and social well-being in communities. The main policy priorities arising here are to ensure that social issues are fully considered alongside economic and environmental impacts in transportation decisions.

Lee, R. J. and I. N. Sener (2016). "Transportation planning and quality of life: Where do they intersect?" Transport Policy 48: 146-155

> The authors posit that there is a limited understanding of the ways in which transportation and quality of life (QOL) intersect beyond physical health. They propose a framework to measure QOL in four dimensions - physical, mental, social, and economic well-being, which are influenced by three transportation factors: mobility/accessibility, the built environment, and vehicular traffic. The authors found that regional transportation planning authorities in the United States inconsistently address QOL, and that it should be elevated by planners when planning transportation systems.

Litman, T. "Online Transportation Demand Management Encyclopedia."

> Transportation demand management (TDM) is a series of strategies that aim to curb demand for vehicular travel and may also work to encourage active modes. This resource provides an overview of TDM strategies, notably including a chapter on strategies to improve public fitness and health by enabling active transportation. Some case studies are included.

Litman, T. (2017, September). Evaluating Active Transport Benefits and Costs: Guide to Valuing Walking and Cycling Improvements and Encouragement Programs. Victoria, Victoria Transport Policy Institute.

> This literature review describes research of and methods for evaluating the benefits and costs of active transportation (broadly defined as human powered transportation). It overviews research on how population health is impacted by active transportation and provides methods to monetize population health net-benefits. The research and cases presented support the idea that active transportation-enabled health benefits outweigh societal costs. It offers methods for policy-makers to quantify the benefits of new active transportation infrastructure.

Litman, T. and E. Doherty (2009). Transportation Cost and Benefit Analysis: Techniques, Estimates and Implications. Victoria, BC, Victoria Transport Policy Institute. from https://www.researchgate.net/profile/Todd_Litman/publication/235360398_Transportation_Cost_and_Benefit__Analysis_Techniques_Estimates_and_Implications/links/544a94ca0cf2d6347f401152.pdf.

Meehan, L. A. and G. P. Whitfield (2017). "Integrating health and transportation in Nashville, Tennessee, USA: From policy to projects." Journal of Transport & Health 4: 325-333.

> This article explores how the Nashville Metropolitan Planning Organization, Nashville's regional transportation planning authority, has integrated health into transportation planning. The MPO did six things: established priority walking and cycling projects, prioritized active transportation and transit infrastructure projects, scored proposed road projects on health impacts, reserved funding for active transportation, conducted a health study, and modeled, predicted and monetized potential population-level health impacts of shifting modes to active transportation.

Mowat, D., et al. (2014). Improving Health by Design in the Greater Toronto-Hamilton Area. Peel Region, Peel Region.

>	The Greater Toronto-Hamilton Area is expected to absorb 2.2 million more people by 2031. Diabetes rates in the GTHA are rising and the population is increasingly sedentary, putting pressure on the health care system. The authors of this study provide three solutions to accommodating additional population without adding undue burden health care systems: 1. Fund the Big Move (Metrolinx's multi-billion-dollar long-range transportation plan) 2. Strengthen provincial policies to support greater active transportation and public transit use 3. normalize planning for active transportation and public transit use.  The authors attached monetary values to the number of deaths and cases of diabetes that could be prevented if these solutions were implemented.

National Collaborating Centre for Environmental Health (2017). "Health Impact Assessments." Retrieved March 2018, from http://www.ncceh.ca/environmental-health-in-canada/health-agency-projects/health-impact-assessments

>	This website includes links to both internal and external Canadian resources for implementing Health Impact Assessments (HIA).

Oregon Health Authority and Oregon Department of Transportation (2013). Memorandum of Understanding. Salem, Oregon.

>	This MOU formalized the collaboration between the Oregon Health Authority and Oregon Department of Transportation to work together to develop and implement policy goals of safe and active transportation through shared resources and data.

Pedestrian and Bicycle Information Center (2010). Creating Active Rural Communities. from http://www.pedbikeinfo.org/cms/downloads/OTH.CreatingActiveRuralCommunities.pdf.

>	Community coalitions were the key to seeing Haliburton County become a place that enables walking and cycling. They harnessed the community's social capital and delivered plans and strategies to Haliburton municipalities. These municipalities were receptive and have begun to integrate walking and cycling infrastructure, funding, and programming.

Public Health Agency of Canada (2014). Mobilizing Knowledge on Active Transportation: Project Briefing and Highlight Sheets. G. Noxon. Ottawa, Canada, Public Health Agency of Canada.

>	This resource reports on a Canadian scan of practices and interviews at the provincial level to understand strategies, policies, and programs that support active transportation.  Multi-sectoral collaboration was a key theme and this resource contains many ideas for how to support institutionalization of health considerations in transportation.

Public Health Agency of Canada (2017). The Chief Public Health Officer's Report on the State of Public Health in Canada 2017 – Designing Healthy Living. T. Tam. City of Ottawa, ON.

>	This report compiles research to argue that the built environmental can provide a foundation for healthy living in Canadian communities and offers suggestions of how. It focuses on physical activity, healthy diets, and mental wellness.

Raynault, E. and E. Christopher (2013). "How does transportation affect health?" Public Roads 76(6). from https://www.fhwa.dot.gov/publications/publicroads/13mayjun/05.cfm.

>	This article describes several different initiatives - mostly led by regional metropolitan agencies - that are integrating health in transportation planning efforts. A working group of the U.S. Federal Highway Administration on the subject is also described.

Robert Wood Johnson Foundation (2012). How does Transportation Impact Health? Health Policy Snapshot, Robert Wood Johnson Foundation. from https://www.rwjf.org/content/dam/farm/reports/issue_briefs/2012/rwjf402311.
>    This 2-page brief summarizes the science and policy implications of including health in transportation.

Sreedhara, M., et al. (2017). "Qualitative Exploration of Cross-Sector Perspectives on the Contributions of Local Health Departments in Land-Use and Transportation Policy." Preventing Chronic Disease 14. from <Go to ISI>://WOS:000423786800013.
>    Local health departments (LHDs) are encouraged to participate in built-environment policy processes, which are outside their traditional expertise. Cross-sector collaborations are needed, yet stakeholders' perceptions of LHD involvement are not well understood. The objective of this study was to describe the perceived value of LHD participation in transportation and land-use decision making and potential contributions to these processes among stakeholders.

van Lierop, D., et al. (2016). "Bicycle Education for Children Evaluation of a Program in Montreal, Quebec, Canada." Transportation Research Record (2587): 23-33.
>    The authors found that a bicycle education program for school-aged children was effective in Montreal for teaching basic bicycle safety (reading signs, hand signals), increasing children's confidence on bicycles, and increasing parents' confidence in allowing their children to participate in ride-to-school programs. The authors encourage planners to prioritize safe bicycle infrastructure and traffic calming near schools.

Vision Zero Network (2017). Centering Safety at Metropolitan Planning Organizations. from https://www.slideshare.net/KathleenFerrier/centering-safety-at-metropolitan-planning-organizations.
>    MPOs are regional influencers that can align their work with the goal of saving lives. They set goals and targets within their regional transportation plans, they provide funding for transportation, and they develop transportation-related policy. MPOs can integrate Vision Zero principles in those three areas to save lives.

Walsh, R. (2012). Local Policies and Practices That Support Safe Pedestrian Environments. Washington, DC, National Cooperative Highway Research Program.
>    This report synthesizes regulatory, administrative, and financial tools used by communities in the United States to provide safe pedestrian environments. Lessons learned include: support from agency leaders and elected officials is an important component of success. Formal policy guidance from the community is important. Interagency cooperation can be crucial. Community outreach offers significant benefits. Case studies are referenced throughout.

## INSTITUTIONALIZATION AND POLICY – ADDITIONAL SECONDARY RESOURCES

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City of Toronto (2017). Complete Streets Guidelines. Toronto, ON, City of Toronto. from https://www.toronto.ca/services-payments/streets-parking-transportation/enhancing-our-streets-and-public-realm/complete-streets/complete-streets-guidelines/.

Cohen, A. P., et al. (2008). "Carsharing: A guide for local planners." Institute of Transportation Studies, UC Davis(UCD-ITS-RP-08-16).

Complete Streets for Canada (2018). "Complete Streets Canada Map." Retrieved March 2018, from http://completestreetsforcanada.ca/map.

Council, F. B. (2009). Transportation Demand Management: A Small and Mid-Size Communities Toolkit. Fraser, Fraser Basin Council. from https://www.fraserbasin.bc.ca/_Library/CCAQ/toolkit_tdm_2009.pdf.

Craig, K. and J. van Hemert (2012). Healthy Communities Practice Guide, Canadian Institute of Planners. from https://www.cip-icu.ca/Files/Healthy-Communities/CIP-Healthy-Communities-Practice-Guide_FINAL_lowre.aspx.

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Sustainable Transportation System at the Same Time, Infrastructure Canada.

IBI Group (2015). Transportation Demand Management Land Development Guidelines. Hamilton, City of Hamilton. from https://www.hamilton.ca/develop-property/policies-guidelines/transportation-demand-management-land-development-guidelines.

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McCallum, L. C., et al. (2015). "Advancing the practice of health impact assessment in Canada: Obstacles and opportunities." Environmental Impact Assessment Review 55: 98-109.
        Discussion of the current state of HIA practice in Canada.

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## DESIGNING SAFE MULTI-MODAL SYSTEMS – PRIMARY RESOURCES

American Public Health Association (2009). Improving Health Through Transportation and Land-Use Policies, American Public Health Association. from https://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2014/07/31/08/21/improving-health-through-transportation-and-land-use-policies.
> This policy statement advocates for integration of safety into policy-making among American regional transportation entities. It emphasizes that this is an equity issue, as low-income communities and some communities of colour disproportionately bear the negative health impacts of transportation and land-use. It lays out five goals for policy makers, for example, tying federal transportation funding to health and safety.

Beck, L. F., et al. (2007). "Motor vehicle crash injury rates by mode of travel, United States: using exposure-based methods to quantify differences." Am J Epidemiol 166(2): 212-218. from http://www.ncbi.nlm.nih.gov/pubmed/17449891.
> The authors calculated fatal and nonfatal traffic injury rates in the United States from 1999-2003. Fatal injury rates were highest for motorcycles, pedestrians, and cyclists, while non-fatal injury rates were highest for motorcycles and cyclists. Injury rates varied by mode of travel, sex, and age.

Cambridge Systematics Inc (2012). Framework for Institutionalizing Safety in the  Transportation Planning Process, National Cooperative Highway Research Program.
> The study team developed a framework of recommendations and actions that American regional transportation planners can implement to consider safety more comprehensively. This report is part of a strategy to institutionalize safety into planning decisions.

Canadian Public Health Association (2014). Healthy Canada by Design Supplement: Canadian Journal of Public Health. Ottawa, ON, Canadian Public Health Association. 106. from https://journal.cpha.ca/index.php/cjph/article/viewFile/5009/2998.

Carlson, S. A., et al. (2017). "Prevalence of Complete Streets policies in US municipalities." Journal of Transport & Health 5: 142-150.
Approximately a quarter of municipalities in the United States have a 'Compete Streets' policy. Smaller American communities, Southern communities, and municipalities with low median education levels were less likely to have adopted or implemented such a policy.

CCMTA (2016). Towards Zero: The Safest Roads in the World, Canadian Council of Motor Transportation Administrators. from http://roadsafetystrategy.ca/en/.
The RSS 2025 strategy aims to encourage road safety stakeholders to collaborate to achieve the long-term vision of zero fatalities and serious injuries on Canadian roadways. It sets out principles, strategic objectives to achieve this vision and synthesizes information on broad risk groups, contributing factors, and safety interventions.

Centers for Disease Control and Prevention (2012). "Motor Vehicle Crash Deaths in Metropolitan Areas — United States, 2009." Morbidity and Mortality Weekly Report (MMWR) 61(28): 523-528. from http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6128a2.htm?s_cid=mm6128a2_w.
This report presents motor vehicle crash fatality rates across the 50 most populous US metropolitan statistical areas in 2009. Rates in those areas vary widely, but when combined are lower than the nation overall.

Elvik, R. and T. Bjørnskau (2017). "Safety-in-numbers: a systematic review and meta-analysis of evidence." Safety Science 92: 274-282. from https://www.sciencedirect.com/science/article/pii/S0925753515001812.
This systematic review and meta-analysis examined 26 studies that examined a safety-in-numbers effect for pedestrians, cyclists, and motor vehicles. The authors conclude that a safety-in-numbers effect exists for all modes, and that the studies on the topic are highly consistent. As the volume of a traffic mode increases, crashes in that mode should proportionately decrease.

Fox, J. and L. Shahum (2017). Centering Safety at Metropolitan Planning Organizations, Vision Zero Network.
Metropolitan planning organizations are American regional transport authorities that could align their work with the goal of saving lives. They set goals and targets within their regional transportation plans, they provide funding for transportation, and they develop transportation-related policy. MPOs can integrate Vision Zero principles in those three areas to potentially save lives.

Haggerty, B., et al. (2015). Transportation Research Briefs. P. H. D. Health Impact Assessment. Portland, Oregon, Oregon Health Authority.
This brief synthesizes the strength of evidence linking transportation and health for the Oregon Health Authority. The authors show how active transportation is good for population health and recommend that transportation systems should designed to make active transportation a viable choice.

Harris, M. A., et al. (2011). "The Bicyclists' Injuries and the Cycling Environment study: a protocol to tackle methodological issues facing studies of bicycling safety." Inj Prev 17(5): e6. from http://www.ncbi.nlm.nih.gov/pubmed/21653651.
>    The authors of this paper detail a novel research design for studying infrastructure, trip choice, and ultimately the safety of the cycling infrastructure environment through analysis of injury sites and cyclist interviews in Vancouver, BC.

Jacobsen, P. L., et al. (2009). "Who owns the roads? How motorized traffic discourages walking and bicycling." Injury Prevention 15(6): 369-373. from http://injuryprevention.bmj.com/content/15/6/369.
>    This review of academic and non-academic literature found that walking and cycling are discouraged by real and perceived traffic-related danger and discomfort. Interventions that reduce vehicles speeds and volumes are relatively inexpensive and likely to be successful in promoting active modes.

Lee, J. and e. al (2013). "Safely active mobility for urban baby boomers: The role of neighborhood design." Accid Anal Prev.
>    This study of traffic collision patterns in Boston, MA revealed that accessibility to retail and traffic volume and speed are positively related with a higher frequency of collisions involving older pedestrians. Better land use diversity, intersection density, and accessibility to retail tended to increase walking among urban baby boomers.

Mader, E. M. and C. D. Zick (2014). "Active transportation: Do current traffic safety policies protect non-motorists?" Accident Analysis and Prevention 67: 7-13.
>    The authors of this American study found that higher expenditures on highway law and traffic safety enforcement was a key factor in decreasing non-motorist traffic fatalities. As state alcohol consumption is positively related with non-motorist fatality rates, policy makers should also aim to address driver and non-driver intoxication to reduce effects of alcohol consumption on traffic safety.

Miranda-Moreno, L. F., et al. (2011). "The link between built environment, pedestrian activity and pedestrian-vehicle collision occurrence at signalized intersections." Accid Anal Prev 43(5): 1624-1634.
>    This paper studied the influence of built environment features (density, land use mix, transit supply) on pedestrian-vehicle collision occurrence in the City of Montreal. The built environment was shown to have a large effect on pedestrian activity but little direct effect on pedestrian-vehicle collision frequency. The main factor was the number of vehicles entering the intersection.

Moran, M., et al. (2014). "Understanding the relationships between the physical environment and physical activity in older adults: a systematic review of qualitative studies." International Journal of Behavioral Nutrition and Physical Activity 11: 79. from https://ijbnpa.biomedcentral.com/articles/10.1186/1479-5868-11-79.
>    The authors of this research undertook a systematic review of international qualitative research on the impact of physical environment on older adults' physical activity levels. Themes discussed included pedestrian infrastructure, safety, access to facilities, aesthetics, and environmental conditions.

Morency, P., et al. (2012). "Neighborhood Social Inequalities in Road Traffic Injuries: The Influence of Traffic Volume and Road Design." American Journal of Public Health 102(6): 1112-1119. from http://ajph.aphapublications.org/doi/abs/10.2105/AJPH.2011.300528.
National Cooperative Highway Research Program (2016). Design Guidance for Channelized Right-Turn Lanes. Web-only Document 208. Washington DC, Transportation Research Board. from http://www.trb.org/Publications/Blurbs/171734.aspx.
>    Design Guidance for Channelized Right-Turn Lanes develops guidance for channelized right-turn lanes based on balancing the needs of motor vehicles, pedestrians, and bicycles.

National Highway Traffic Safety  Administration (2017). USDOT Releases 2017 Fatal Traffic Crash Data. Washington DC, NHTSA Public Affairs. from https://www.nhtsa.gov/press-releases/usdot-releases-2016-fatal-traffic-crash-data.
>   This press release links to the 2016 U.S. fatal traffic crash data including trends of underlying causes.

National Highway Traffic Safety Administration (2017). 2016 Fatal Motor Crashes Overview. Traffic Safety Facts: Research Note. Washington DC, U.S. Department of Transportation. from https://crashstats.nhtsa.dot.gov/Api/Public/Publication/812456.
>   This brief provides statistics about traffic deaths in the U.S. during 2016 including rates and underlying cause.

Noland, R. B., et al. (2017). "How good is pedestrian fatality data?" Journal of Transport & Health 7: 3-9.
>   Analysis of one year of pedestrian deaths in New Jersey, the US state with the highest share of pedestrian deaths, found the data unreliable and inconsistent.

Peterniak, R., et al. (2016). Vision Zero Adoption in Canada. 2016 CITE Conference. Kelowna, BC. from https://visionzeroai.com/resource/vision-zero-adoption-in-canada/cite-vision-zero-adoption-in-canada-final-paper/.
>   This paper examines the strategies, programs, and common challenges of adopting Vision Zero across 21 Canadian jurisdictions. Specifically, it examines adoption processes and programs, compares these with the effective adoption principles for Vision Zero, and identifies common challenges.

Ross, A., et al. (2017). "Associations between the Physical, Sociocultural, and Safety Environments and Active Transportation to School." American Journal of Health Education 48(3): 198-209.
>   Previous research shows that active transportation to school rates among youths are influenced by the physical environment (PE), sociocultural environment (SCE), and safety environment (SE). This study found that in Phoenix, Arizona elements of the PE and SCE impacted the odds of students actively transporting to school. Perceived SE factors such as 'stranger danger' significantly and directly influenced PE and SCE. Practitioners should therefore focus programming efforts on improving perceptions of active transportation safety.

Rothman, L., et al. (2014). "Walking and child pedestrian injury: a systematic review of built environment correlates of safe walking." Injury Prevention 20(1).
>   The authors reviewed 50 walking and 35 child pedestrian injury studies to determine how built environment and urban design features correlated with children's walking and pedestrian injuries. Among all the studies examined, only traffic calming and playground/recreation areas were consistently correlated with higher levels of youth walking and fewer pedestrian injuries.

Rothman, L., et al. (2014). "Motor Vehicle-Pedestrian Collisions and Walking to School: The Role of the Built Environment." Pediatrics 133(5): 776-784. from http://pediatrics.aappublications.org/content/early/2014/04/02/peds.2013-2317.
>   The authors of this study showed that the pedestrian collision risk was primarily related to the built environment and specifically intersection features, more so than proportion of people walking. This study focused on children at walking to school in the City of Toronto. Planners should therefore seek to minimize or mitigate road crossings for children to travel to school.

Schepers, J. P. and E. Heinen (2012). "How does a modal shift from short car trips to cycling affect road safety?" <u>Accid Anal Prev</u>. from
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=2304050
7.

> This study discusses how transferring short trips made by cars to bicycles does not change the number of fatalities, but increases the number of serious road injuries. The neutral effect on fatalities, despite the high fatality risk for cyclists, can be explained by there being fewer cars on the road to pose a risk to others, the shorter length of bicycle trips compared to the car trips they replace, and the "safety in numbers" phenomenon.

Shahum, L. (2017, August). Centering Safety at Metropolitan Planning Organizations. Vision Zero Network, Vision Zero Network: 1-6.

Singleton, P. A. and K. J. Clifton (2014). "Incorporating public health in US long-range metropolitan transportation planning: A review of guidance statements and performance measures." <u>TRB 94th Annual Meeting Compendium of Papers</u>. from https://trid.trb.org/view/1337481.

> Long-range transportation plans developed by US regional metropolitan planning organizations typically consider only safety and air pollution. Health and accessibility are rarely included in the institutionalized structure of US regional transportation planning, even in recently developed plans (pre-August 2014). More work is needed to develop health-based performance measures, among others.

Toronto Public Health, et al. (2014). Active City: Designing for Health. Toronto, City of Toronto.

> This resource explicitly centers health - primarily through a discussion of physical activity and built environment - within the Canadian context. It also acknowledges safety, physical activity, access, health equity and sustainability. It provides a list of 10 guiding principles, multiple detailed case studies, and additional policies and guidelines that serve as resource.

Transport Canada (2017). Canadian Motor Vehicle Traffic Collision Statistics: 2015, Transport Canada. from https://www.tc.gc.ca/eng/motorvehiclesafety/tp-tp3322-2015-1487.html.

Transportation Association of Canada (2018). Canadian Guide to Traffic Calming - Second Edition. Ottawa, Canada, Transportation Association of Canada. from http://www.tac-atc.ca/en/tac-releases-canadian-guide-traffic-calming-second-edition.

> This Canadian guide to traffic calming has recently been updated.

Urban Design 4 Health (2013). Building Evidence to Support Healthy Street Design in Toronto, Toronto Public Health. from http://urbandesign4health.com/projects/building-evidence-to-support-complete-healthy-streets-in-toronto.

> This review for the City of Toronto identifies and assess published evidence on the association of street design features and health outcomes. It offers guidance on how this evidence can promote healthier street design in Toronto. Sections include pedestrian space, cycling facilities, roadways, and adjacent buildings and land uses.

Vision Zero Network (2016). The Central Role of Public Health in Vision Zero. from https://visionzeronetwork.org/project/the-central-role-of-public-health-in-vision-zero/.

> This report explores San Francisco, Chicago, and New York City are using public health tools to reduce traffic deaths. These case studies are best practices for how cities can prioritize and streamline the process of improving the safety of their streets.

Vision Zero Network (2017). Centering Safety at Metropolitan Planning Organizations. from
https://www.slideshare.net/KathleenFerrier/centering-safety-at-metropolitan-planning-organizations.
> MPOs are regional influencers that can align their work with the goal of saving lives. They set goals and
> targets within their regional transportation plans, they provide funding for transportation, and they
> develop transportation-related policy. MPOs can integrate Vision Zero principles in those three areas to
> save lives.

Winters, M., et al. (2012). "Safe Cycling: How Do Risk Perceptions Compare with Observed Risk?" Canadian
Journal of Public Health-Revue Canadienne De Sante Publique 103(9): S42-S47. from
http://journal.cpha.ca/index.php/cjph/article/view/3200/2668.
> The authors studied the perceived risk of cycling infrastructure versus the actual safety risk of cycling
> infrastructure, which was informed by the injury locations of 690 hospitalized cyclists in Toronto and
> Vancouver. In general, people's perceptions of the safety risk for particular infrastructure was in line
> with what was found from the injury data.

Wong, B. Y. M., et al. (2011). "GIS measured environmental correlates of active school transport: A systematic
review of 14 studies." International Journal of Behavioral Nutrition and Physical Activity 8. from
https://www.ncbi.nlm.nih.gov/pubmed/21545750.
> The authors of this systematic review examined 14 studies on built environment factors correlated to
> active transportation to school (ATS). Distance to school was the only factor consistently related
> (negatively) to ATS. Land mix, residential density, and intersection density did not consistently correlate
> with ATS.

World Resources Institute, R. C. (2018, January). Sustainable & Safe: A Vision and Guidance for Zero Road
Deaths. Washington, D.C. from https://www.wri.org/publication/sustainable-and-safe-vision-and-guidance-
zero-road-deaths.

## DESIGNING SAFE MULTI-MODAL SYSTEMS – ADDITIONAL SECONDARY RESOURCES

Arason, N. (2014). No Accident: Eliminating Injury and Death on Canadian Roads, Wilfrid Laurier University Press.

Atherton, E., et al. (2017). Dangerous by Design 2016, Smart Growth America,  National Complete Streets
Coalition.

Charest, P. and P. Hay (2010). Canada: National Reporting to CSD-18/19 Thematic Profile: Transport, United
Nations Department of Economic and Social Affairs. from
https://sustainabledevelopment.un.org/dsd_aofw_ni/ni_natiinfo_canada.shtml.

Complete Streets for Canada (2018). "Complete Streets Canada Map." Retrieved March 2018, from
http://completestreetsforcanada.ca/map.

Cutumisu, N., et al. (2014). "Influence of area deprivation and perceived neighbourhood safety on active
transport to school among urban Quebec preadolescents." Canadian Journal of Public Health-Revue Canadienne
De Sante Publique 105(5): E376-E382.

Lusk, A. C., et al. (2011). "Risk of injury for bicycling on cycle tracks versus in the street." Inj Prev 17(2): 131-135.

NACTO (2017, March). Creating Safe, Sustainable, Multi-Modal Urban Transportation. NACTO Policy. New York, NACTO. from https://nacto.org/wp-content/uploads/2017/03/NACTO-Policy-2017.pdf.

Nicklett, E. J., et al. (2017). "Neighborhood Environment and Falls among Community-Dwelling Older Adults." International Journal of Environmental Research and Public Health 14(2).

Public Health Agency of Canada (2014). Seniors' Falls in Canada. Ottawa, ON, Public Health Agency of Canada. from http://www.phac-aspc.gc.ca/seniors-aines/publications/public/injury-blessure/seniors_falls-chutes_aines/assets/pdf/seniors_falls-chutes_aines-eng.pdf.

Ramage-Morin, P. (2017). "Cycling in Canada." Health Reports 28(4). from http://www.statcan.gc.ca/pub/82-003-x/2017004/article/14788-eng.pdf.
    Overview of Canadian bicycle crash data and trends.

Shahum, L. (2017, August). Centering Safety at Metropolitan Planning Organizations. Vision Zero Network, Vision Zero Network: 1-6.

World Resources Institute, R. C. (2018, January). Sustainable & Safe: A Vision and Guidance for Zero Road Deaths. Washington, D.C. from https://www.wri.org/publication/sustainable-and-safe-vision-and-guidance-zero-road-deaths.

Yen, I. H., et al. (2014). "How design of places promotes or inhibits mobility of older adults: realist synthesis of 20 years of research." J Aging Health 26(8): 1340-1372.

## SUPPORTING TRAVEL MODE CHOICES AND ACTIVE TRANSPORTATION – PRIMARY RESOURCES

Alliance for Biking & Walking (2016). Bicycling and Walking in the United States 2016 Benchmarking Report. Washington, DC.
    The Alliance for Biking & Walking reports a snapshot of biking and walking in the US every second year. This is the 2016 snapshot. It contains a research relevant to helping the reader make the case for biking and walking improvements. The second half presents the snapshot at the state and city level, with a toolbox of resources for the reader.

Buehler, R., et al. (2016). Moving Toward Active Transportation:   How Policies Can Encourage Walking and Bicycling.
    The authors synthesized the findings of 62 peer-reviewed academic reviews on active transportation. Key findings are presented around the benefits of active transportation, physical conditions that enable active transportation, and policies and programs that enable active transportation.

Canadian Society for Exercise Physiology (2011). Canadian Physical Activity Guidelines. Ottawa, Canada, Canadian Society for Exercise Physiology. from http://csep.ca/CMFiles/Guidelines/CSEP_PAGuidelines_0-65plus_en.pdf.
    This resource provides guidelines for physical activity benchmarks across the age span.  To achieve health benefits, adults aged 18+ years should accumulate at least 150 minutes of moderate- to vigorous-intensity aerobic physical activity per week, in bouts of 10 minutes or more. Youth, ages 5-17, should

accumulate at least 60 minutes of moderate-to-vigorous intensity physical activity daily. Note that the Public Health Agency of Canada has endorsed the guidelines.

Frank, L. D., et al. (2006). "Associations between neighborhood walkability and active transportation, body mass index, and air quality." Journal of the American Planning Association 72(1): 75 - 87. from https://www.tandfonline.com/doi/abs/10.1080/01944360608976725?journalCode=rjpa20.
> The authors found in King County Washington that a 5% increase in walkability (defined in an index as: land use mix, street connectivity, net residential density, and retail floor area ratios) was associated with a 32% increase in active transportation, 0.23-point body mass index reduction, 6.5% fewer vehicle miles traveled, and a corresponding drop in air pollution.

Frank, L. D., et al. (2010). "The development of a walkability index: application to the Neighborhood Quality of Life Study." British Journal of Sports Medicine 44(13): 924-933. from https://www.ncbi.nlm.nih.gov/pubmed/19406732.
> The authors of this highly-cited study proposed an integrated index to operationalize walkability with parcel-level information. They examined the validity of the index with travel surveys. The index can be used to investigate associations between urban form and related outcomes and identify areas for transportation enhancements or redevelopments.

Janssen, I. (2013). "The Public Health Burden of Obesity in Canada." Canadian Journal of Diabetes 37(2): 90-96. from http://www.canadianjournalofdiabetes.com/article/S1499-2671(13)00136-6/fulltext.
> This review provided an overview of the public health burden of obesity in Canada. It used the body mass index of Canadians from a nationally representative survey to calculate a direct health care cost of $3.9 billion in 2006. This was due to the direct impacts of obesity on various illnesses such as diabetes and depression.

Kelly, P., et al. (2014). "Systematic review and meta-analysis of reduction in all-cause mortality from walking and cycling and shape of dose response relationship." International Journal of Behavioral Nutrition and Physical Activity 11(1): 132-132. from <Go to WoS>://WOS:000385602500006.
> This meta-analysis of 21 studies showed that walking and cycling have significant benefits on reducing population mortality, even when adjusting for other physical activity. This effect is most significant in groups that have the lowest levels of physical activity.

Lachapelle, U. (2016). Examining the relationship between transit use and active transportation in Canada: a time use approach of the active lifestyle of transit users. Transportation Research Board 95th Annual Meeting. Washington, DC, Transportation Research Board 95th Annual Meeting. from http://www.archipel.uqam.ca/10527/.
> The author found that public transit use was associated with active transportation and meeting physical activity recommendations through walking when analyzing Canada's General Social Survey (n=10,867). This is because transit users tend to take more walking trips than non-users, but not longer walking trips. The author therefore recommends providing land use that enables short walking trips to destinations in transit serviced areas.

Lachapelle, U. and D. G. Pinto (2016). "Longer or more frequent walks: Examining the relationship between transit use and active transportation in Canada." Journal of Transport & Health 3(2): 173-180.
> Transit users take more frequent walks than non-users because they walk to more destinations for specific purposes. Walking is a healthy activity for individuals. Authorities should develop transit infrastructure and provide proximate destinations to provide potential population health benefits beyond reducing travel-related emissions.

National Collaborating Centre for Environmental Health (2017). "Health Impact Assessments." Retrieved March 2018, from http://www.ncceh.ca/environmental-health-in-canada/health-agency-projects/health-impact-assessments.

>   This website includes links to both internal and external Canadian resources for implementing Health Impact Assessments (HIA).

National Cooperative Highway Research Program (2016). Design Guidance for Channelized Right-Turn Lanes. Web-only Document 208. Washington DC, Transportation Research Board. from http://www.trb.org/Publications/Blurbs/171734.aspx.

>   Design Guidance for Channelized Right-Turn Lanes develops guidance for channelized right-turn lanes based on balancing the needs of motor vehicles, pedestrians, and bicycles.

Petrokofsky, C. and A. Davis (2016). Working Together to Promote Active Travel. London, UK, Public Health England. from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/523460/Working_Together_to_Promote_Active_Travel_A_briefing_for_local_authorities.pdf.

>   This guide offers broad actions on policy and implementation for shaping the built environment to increase walking and cycling. It contains an overview of the impacts of travel and physical inactivity on the British population. The intended audience is British local authorities and planners.

Public Health Agency of Canada (2014). Mobilizing Knowledge on Active Transportation: Project Briefing and Highlight Sheets. G. Noxon. Ottawa, Canada, Public Health Agency of Canada.

>   This resource reports on a Canadian scan of practices and interviews at the provincial level to understand strategies, policies, and programs that support active transportation. Multi-sectoral collaboration was a key theme and this resource contains many ideas for how to support institutionalization of health considerations in transportation.

Public Health Agency of Canada (2017). The Chief Public Health Officer's Report on the State of Public Health in Canada 2017 – Designing Healthy Living. T. Tam. City of Ottawa, ON.

>   This report compiles research to argue that the built environmental can provide a foundation for healthy living in Canadian communities and offers suggestions of how. It focuses on physical activity, healthy diets, and mental wellness.

Robitaille, É. (2014). "The Built Environment and Physical Activity: Data Collection Tools to Support Intervention." The TOPO Collection (8). from https://www.inspq.qc.ca/pdf/publications/1953_Built_Environment_Physical_Activity.pdf.

>   This report suggests three data collection methods for developing measures or indicators to analyze the built environment's links to physical activity: georeferenced data, observation checklists (audits), and self-reporting data questionnaires (surveys). The author explains advantages, disadvantages, and examples of use in Quebec for each.

Rojas-Rueda, D., et al. (2013). "Health impact assessment of increasing public transport and cycling use in Barcelona: A morbidity and burden of disease approach." Preventive medicine 57(5): 573-579.

>   This study showed that transportation policies that replace vehicular trips with public transit and cycling yield health benefits in reduced diseases - primarily from physical activity then reduced traffic injuries, and then reduced air pollution. A 40% reduction of short and long vehicular trips could prevent 60-248 cases of disease each year in Barcelona.

Sandt, L., et al. (2015). A Resident's Guide for Creating Safer Communities for Walking and Biking. Washington, DC, Federal Highway Administration: Office of Safety. from https://safety.fhwa.dot.gov/ped_bike/ped_cmnity/ped_walkguide/.
> This guide is geared to help American community members become involved in improving safety for pedestrians and cyclists. It includes successful case studies, strategies to identify issues and how and when to partner with supporting organizations.

Toronto Public Health, et al. (2014). Active City: Designing for Health. . Toronto, City of Toronto.
> This resource explicitly centers health - primarily through a discussion of physical activity and built environment - within the Canadian context.  It also acknowledges safety, physical activity, access, health equity and sustainability. It provides a list of 10 guiding principles, multiple detailed case studies, and additional policies and guidelines that serve as resource.

Transport Canada (2011). Active Transportation in Canada: A Resource and Planning Guide. EcoPlan International. Ottawa, ON, Transport Canada, Environmental Initiatives Group. from http://publications.gc.ca/collections/collection_2011/tc/T22-201-2011-eng.pdf.
> This guide is aimed for Canadian transportation planners and related professionals to plan for and support active transportation in current and long-range planning and development. It offers approaches to develop active transportation projects as well as case studies, tools, and resources.

Van Dyck, D., et al. (2012). "Perceived neighborhood environmental attributes associated with adults' transport-related walking and cycling: Findings from the USA, Australia and Belgium." Int J Behav Nutr Phys Act 9: 70.

van Lierop, D., et al. (2016). "Bicycle Education for Children Evaluation of a Program in Montreal, Quebec, Canada." Transportation Research Record (2587): 23-33.
> The authors found that a bicycle education program for school-aged children was effective in Montreal for teaching basic bicycle safety (reading signs, hand signals), increasing children's confidence on bicycles, and increasing parents' confidence in allowing their children to participate in ride-to-school programs. The authors encourage planners to prioritize safe bicycle infrastructure and traffic calming near schools.

Wang, Y., et al. (2016). "A review on the effects of physical built environment attributes on enhancing walking and cycling activity levels within residential neighborhoods." Cities 50: 1-15.
> This comprehensive review aims to help designers and planners facilitate increased levels of walking and cycling in a residential neighbourhood. The authors identified a list of general and specific characteristics for built environment attributes that help overcome barriers and create a supportive environment for walking and cycling. These include public leisure space, specific road, trail and path design, and providing a wide choice of public facilities. This research was informed by over 150 academic papers and reports from authoritative organization such as the World Health Organization.

Wen and Kowaleski-Jones (2012). "The built environment and risk of obesity in the United States: Racial–ethnic disparities." Health & Place 18(6). from https://www.ncbi.nlm.nih.gov/pubmed/23099113.
> In this study, the built environment was not found to be a significant mediator of obesity disparities buy race-ethnicity. Neighbourhood walkability, density, and distance to parks were however significantly related to obesity risk when controlling for individual and neighbourhood characteristics.

## SUPPORTING TRAVEL MODE CHOICES AND ACTIVE TRANSPORTATION – ADDITIONAL SECONDARY RESOURCES

Clarke, P. and N. A. Gallagher (2013). "Optimizing Mobility in Later Life: The Role of the Urban Built Environment for Older Adults Aging in Place." Journal of Urban Health-Bulletin of the New York Academy of Medicine 90(6): 997-1009.

Complete Streets for Canada (2018). "Complete Streets Canada Map." Retrieved March 2018, from http://completestreetsforcanada.ca/map.

Creatore, M. I., et al. (2014). "The Impact of Neighbourhood Walkability on the Rise in Overweight, Obesity, and Diabetes in Ontario, Canada, 2001-2010." Diabetes 63: A21-A21.

Durand, C. P., et al. (2011). "A systematic review of built environment factors related to physical activity and obesity risk: implications for smart growth urban planning." Obesity Reviews 12(501): e173-e182.

Ferdinand, A. O., et al. (2012). "The Relationship Between Built Environments and Physical Activity: A Systematic Review." American Journal of Public Health 102(10): E7-E13.

Hirsch, J. A., et al. (2016). "The influence of walkability on broader mobility for Canadian middle aged and older adults: An examination of Walk Score and the Mobility Over Varied Environments Scale (MOVES)." Preventive medicine.

Humphreys, B. R., et al. (2014). "Physical Activity and Health Outcomes: Evidence from Canada." Health Economics 23(1): 33-54.

Laverty, A. A., et al. (2013). "Active Travel to Work and Cardiovascular Risk Factors in the United Kingdom." American Journal of Preventive Medicine 45(3): 282-288.

Loo, C. K. J., et al. (2017). "Association between neighbourhood walkability and metabolic risk factors influenced by physical activity: a cross-sectional study of adults in Toronto, Canada." BMJ open 7(4): 10.

Loptson, K., et al. (2012). "Walkable for Whom? Examining the Role of the Built Environment on the Neighbourhood-based Physical Activity of Children." Canadian Journal of Public Health-Revue Canadienne De Sante Publique 103(9): S29-S34.

Lukes, J., et al. (2011). Greater Strides: Taking Action on Active Transportation, Manitoba's Active Transportation Advisory Group. from http://www.gov.mb.ca/sd/pdf/atag_report6.pdf.

McCormack, G. R. and J. S. Virk (2014). "Driving towards obesity: A systematized literature review on the association between motor vehicle travel time and distance and weight status in adults." Preventive medicine. from http://www.ncbi.nlm.nih.gov/pubmed/24929196.

Mitchell, C. A., et al. (2016). "Built Environment Influences of Children's Physical Activity: Examining Differences by Neighbourhood Size and Sex." International Journal of Environmental Research and Public Health 13(1).

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## ACCESS TO HEALTH PROMOTING SERVICES – PRIMARY RESOURCES

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> Transport facilitates psychological well-being through directly impacting health outcomes and enabling (or disabling) access to important life destinations such as work, health or recreation. Policy makers should be cognizant of these effects and refer to other literature in this relatively nascent field.

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> The authors concluded that there was limited or no causal relationship between public green or blue spaces and mental health, based on their systematic review of topical academic studies. They suggest that further research is needed provide consistent evidence on the characteristics of green and blue spaces that might promote better mental health.

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> This resource explicitly centers health - primarily through a discussion of physical activity and built environment - within the Canadian context.  It also acknowledges safety, physical activity, access, health equity and sustainability. It provides a list of 10 guiding principles, multiple detailed case studies, and additional policies and guidelines that serve as resource.

## ACCESS TO HEALTH PROMOTING SERVICES – ADDITIONAL SECONDARY RESOURCES

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