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Built Environment and Active Populations Lab

HEALTH & ECONOMIC BENEFITS OF WALKING IN ST. JOHN'S, NEWFOUNDLAND AND LABRADOR

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EXECUTIVE SUMMARY

Physical inactivity and related chronic diseases like diabetes, heart disease, and mental illnesses are common in Newfoundland and Labrador. One important way to increase physical activity is by increasing active transportation. There are many additional benefits to walking as a mode of transportation, including decreased carbon emissions, improved environmental health, less roadway congestion, and improved road safety. Improvements to walking infrastructure, however, can be expensive. City planners and decision-makers often seek economic analyses to justify the upfront costs of such projects. These analyses can be difficult to conduct because they often require resources and expertise beyond that of municipal staff or community groups. User-friendly tools like WHO’s Health Economic Assessment Toolkit (HEAT) have been created to provide estimates of the health economic impact of investment into walking and/or bicycling infrastructure.

Using HEAT, our assessment identified the potential health and economic benefits of increased walking in St. John’s, NL. City-specific data inputs on population demographics, physical activity, and air pollution exposure were used to calculate estimates of premature deaths prevented, carbon emissions reduced, and health-economic impacts. Our objective was to estimate the benefit-cost ratio of potential walking infrastructure investments and provide recommendations for city council to promote and support a walkable St. John’s.

Our main analysis evaluated the health-economic impact of doubling the mode share of walking in St. John’s from 4.6% to 9.2% - an increase of 3 minutes per person per day of walking. We estimated the economic benefit to be $117,656,000 and the health benefit to be 18 premature deaths prevented over a 10-year period. If $3 million were invested annually, the benefit-cost ratio would be 4 - meaning that the benefit would be 4 times greater than the cost. These results are largely driven by physical activity benefits and premature deaths prevented, rather than carbon emission reductions. A variety of sensitivity analyses highlighted which data inputs had the most significant effect on assessed outcomes. These were the time horizon, the value of statistical life, and the walking mode share target.

We used these results to highlight which areas of municipal control will have the greatest impact on walking mode share in St. John’s: the time horizon, the target mode share, and the investment cost. To identify the health and economic benefits of increased walking in St. John’s, programs, projects and/or policies must:

1. Be implemented and evaluated for a longer period of time
2. Have clear data collection methods

GLOSSARY

Mode share: The percentage of travellers using a particular type of transportation.

Value of Statistical Life (VSL): A representation of the societal economic value of reduced premature mortality.

Social cost of carbon: A monetary measure of the global damage expected from climate change from the emissions of an additional tonne of carbon dioxide (CO_2) in the atmosphere in a given year.

Benefit-cost ratio: The ratio of monetary gain against investment cost of a program or project. >1 = more beneficial than costly. <1 = more costly than beneficial.

TABLE OF CONTENTS

INTRODUCTION

Why Walk?

The Potential Benefits of Walking

The Chronic Disease Action Plan for Newfoundland and Labrador (NL) states that 50% of NL residents 12 years and older are not physically active.(1) Physical inactivity is strongly linked to pervasive chronic diseases in NL, like obesity, heart disease, chronic obstructive pulmonary disease (COPD), diabetes, and mental illness.(2) In fact, rates of diabetes, high blood pressure and obesity in NL are the highest in the country.(3) In 2018, there were 537 hospitalizations per 100,000 Newfoundlanders and Labradorians due to mental illness and/or addiction, higher than the national average of 495.(4) The health benefits of physical activity are numerous including improving cardiovascular health, improving mental health by reducing anxiety and depression, providing a healthy outlet for stress, and improving self-esteem and cognition.(5)

One important way to increase physical activity is by increasing active transportation. Active transportation is defined as using your own power to get from one place to another and includes walking, bicycling, skateboarding, using a wheelchair, and running/jogging. (6) There are even more benefits to walking as a mode of transportation. Less motor vehicle driving means decreased carbon emissions and improved environmental health, less congestion on roadways, and improved safety for all road users.(7) More active transportation means less competition for the already limited number of parking spaces in St. John's, particularly in the downtown area. Each of these benefits have an associated economic benefit. Further, studies show that pedestrians and active commuters spend more, supporting more local businesses and helping to boost the local economy.(8) This point has been confirmed in our province by the Water St. pedestrian mall, and the envy of other nearby streets' businesses.

Potential Risks of Walking

While the potential risks of walking are minimal, they do exist, largely due to increased exposure to outdoor air pollution.(9) As outdoor air pollution levels rise, the risk associated with active transportation increases. In large urban centers with high levels of air pollution, increased exposure to air pollution through increasing active transportation should be more seriously considered. As a small city, St. John's has a relatively low level of air pollution and minimal risk due to exposure to outdoor air pollution.

How to Increase Walking

If You Build It, They Will Come

Increasing walking in St. John's will require more than just promotion and education. Built environment changes that increase walkability, like narrower and/or one-way streets, wider sidewalks, separate bike lanes, and connected walking/biking routes, are likely to be more successful at increasing walking as a mode of transportation. Built environment can be an important facilitator or barrier to walking.(10) Without changes that allow safe, accessible, connected walking routes, we will not successfully increase walking in St. John's. Simply put, when you make walkable cities, people walk more. This is supported by the research of many city planners and urban designers globally,(11) and exemplified in Vancouver, BC, where 52.8% of all city trips are made by walking, cycling, and/or transit.(12)

Barriers to Investment in Walking Infrastructure

City budgets are limited and there are many competing projects. Due to financial constraints, city planners and decision-makers seek economic analyses to prioritize and approve future projects. A benefit-cost ratio is a common economic assessment tool used by decision-makers to determine a project's cost-effectiveness. Despite a commitment to active transportation in the City of St. John's 2019-2029 Strategic Plan (13) roadway design continues to prioritize motor vehicles. For example, recent cuts to the city's capital works budget have delayed several active transportation projects including a traffic calming program, the first stage of the 'Bike St. John's Master Plan', and pedestrian and bicycle counters. Analyses are required to demonstrate the potential economic benefits of walking are greater than their cost. Specifically, these analyses must be done at the local level. St. John's has a unique climate, history, and geography. Economic assessments conducted in other cities can help inform some policies but may not provide sufficient local information to be as useful as possible.

HEAT tool

The World Health Organization (WHO) has developed a user-friendly health impact assessment tool - the Health Economic Assessment Tool (HEAT).(14) This tool calculates the economic and health benefits of walking and/or cycling investment for a city or region. Using longitudinal city-specific data inputs, HEAT provides a benefit-cost ratio considering the economic value of population health improvements due to increased active transportation.

This is not the first example of HEAT being used in Canada. In the Greater Toronto-Hamilton Area (GTHA), HEAT was used to justify the cost of "The Big Move" - a transportation program with the goal of increasing active transportation.(15) Their analysis showed that within 10 years, "there would be a savings of $250 million in lifetime medical costs." In another example, Impacts of Bicycle Infrastructure in Mid-Sized Cities (IBIMS) used the HEAT tool to evaluate the health and economic impact of investment into biking infrastructure in three Canadian cities - Victoria, Kelowna, and Halifax. In their assessment, a moderate increase in biking mode share resulted in benefit-cost ratios of 1.7, 1.9, and 2.1 respectively.

HEAT, however, is not the only health impact assessment tool used among Canadian researchers in this field.(16) Tétreault et al., 2018, used the Integrated Transport and Health Impacts Model (ITHIM) to assess the health impacts of transit usage in Montreal, QC. Their assessment concluded that new infrastructure will reduce the overall burden of transportation related disability adjusted life years by 2.5 per 100,000 persons.(17)

To increase active transportation, many cities across Canada are making investments into active transportation infrastructure. Encouraging walking as a safe and viable form of transportation could have important health, environmental, and economic benefits for Newfoundland and Labrador. Using HEAT, our assessment will identify the potential health and economic benefits of increased walking in St. John's, NL, relative to current rates. Our objective is to estimate the benefit-cost ratio of potential walking infrastructure investments and provide recommendations for city council to promote and support a walkable St. John's.

METHODS

The WHO HEAT tool (version 4.2, released May 2019) is designed to enable users without expertise in impact assessment to conduct economic assessments of the health impacts of walking and/or cycling.(14)

HEAT can be used to assess one-case or two-case scenarios. One-case scenarios provide point-in-time results from a single time point, while two-case scenarios provide comparative results from before-and-after data. In our HEAT analyses, we used a two-case assessment (comparing a baseline reference year (2016) with a future infrastructure build-out year (2020)). We used 2016 as our reference year, because the most recent available data for NL was collected through the 2016 Canadian Census. We used 2020 as our build-out year to provide current results.

Data Inputs

City-specific data inputs on population demographics, physical activity, and air pollution exposure are used to calculate estimates of premature deaths prevented, carbon emissions reduced, and health-economic impacts (monetary value of premature deaths prevented and benefit-cost ratios). Table 1 shows the data input values for our main analysis (walking mode share increase from 4.6% to 9.2%).

Due to the longitudinal nature of both the health benefits of active transportation and the HEAT evaluation process, short term survey data would be insufficient. Our inputs were estimated using the best available long term, population-level data, taken from the most recent Canadian Census survey results.

The most important data inputs for the HEAT tool are travel volume, comparison case, investment cost, and time horizon. We describe those inputs below.

Total Travel Volume

Total daily travel volume data is not collected by a population-based survey in Canada. To estimate this value, we multiplied the population of St. John's, NL used in the Journey to Work question in the Census (97,920)(18) by the average commuting time (19.3 minutes)(19) and an average number of trips per day (3.5), giving a total travel volume of 6,614,496 minutes per day. Without a specific value for St. John's based on a household travel survey, we considered this approach to be a reasonable estimation of the total daily travel volume. St. John's is currently in the process of planning a household travel survey, which would allow us to refine our estimates once it is complete.

Comparison Case

Our main analysis considers the benefits of doubling walking mode share from 4.6% to 9.2%. Many Canadian cities of similar population size and current walking mode shares have targets of ~12%, these cities include Barrie, Kitchener, Thunder Bay, and Moncton.(20) We believe that our main analysis scenario represents an achievable increase that is in line with other municipalities in Canada.

Investment Cost

Currently, the City of St. John's invests ~$3 million annually into maintaining walking infrastructure through construction, snow clearing, etc. This value was estimated from a detailed review of the previous city budgets and expenditure reports.(21) We used this value as a realistic investment cost in our main analysis ($3 million annually or $30 million over a 10 year time horizon). $3 million represents only 1% of the city's total expenditure from 2019.

Time Horizon

HEAT uses 10 years as the default evaluation time horizon. From previous reports using HEAT, we know that time horizon was an important variable, therefore we opted to use the evidence-based default provided by HEAT. We also examined sensitivities of the results to different time horizons.

TABLE 1. Data Inputs for HEAT Tool in St. John's, Newfoundland and Labrador

Data Input - Active Modes Data	
Total travel volume /day by all modes in St. John's (minutes)	6,614,496
Reference case (2016) walking mode share (%)	4.6
Comparison case (2020) walking mode share (%)	9.2
Population size (2016/2020)	97,920
Data Input - Motorized Modes Data	
Reference case (2016) driving (%)	90
Comparison case (2016) driving (%)	90
Reference case (2016) public transport data (%)	3.1
Comparison case (2016) public transport data (%)	3.1
Data Adjustment - General Adjustments	
Proportion excluded (%)	10
Temporal & Spatial adjustment (%)	0
Take-up time for travel demand (years)	3
Data Adjustment - Contrast Adjustments	
Proportion of new trips (%)	0
Proportion for transport (%)	90
Data Adjustment - Others	
Proportion 'in traffic' (%)	70
Traffic conditions (km/h)	35
Substitution of physical activity (%)	0
Monetization Parameters	
Investment costs ($)	20,850,600
Discount year	2016
Parameter Review - Calculation Parameters	
Default carbon value (2016) (USD2014/tCO2) (22)	39.31
Default carbon value (2025) (USD2014/tCO2) (22)	48.1
Discount rate (%) (23)	1.5
Average walking speed (km/h)	5.3
Average car speed (km/h)	42
Average public transport speed (km/h)	22.7
Value of statistical life (EUR2015) (24)	4,678,823.50
PM2.5 concentration (µg/m3) (25)	4.85
All-cause mortality rate (2016) (deaths/100,000 people) (16)	228.7
All-cause mortality rate (2020) (deaths/100,000 people) (16)	228.7

Scenarios

A variety of sensitivity analyses were used to determine which changes in data input would impact the health economic benefits of increased walking in St. John's. During each sensitivity scenario, all data inputs remained the same as the main analysis, with one altered input. These sensitivity analyses are described in Table 2.

Table 2 - Sensitivity Scenario Descriptions

Scenario	Unique Data Entry
Main Analysis	Walking mode share - 4.6% (reference) to 9.2% (comparison)
Sensitivity 1	Shorter time horizon - 5 years
Sensitivity 2	Longer time horizon - 15 years
Sensitivity 3	Increased walking mode share target - 4.6% to 12%
Sensitivity 4	Longer take up time - 5 years
Sensitivity 5	Higher substitution of physical activity - 25%
Sensitivity 6	Higher investment cost - $5 million annually
Sensitivity 7	Lower Value of Statistical Life (VSL) - $3.5 million
Sensitivity 8	Higher Value of Statistical Life (VSL) - $9.5 million
Sensitivity 9	Decreased vehicle mode share - 90% to 80%

Model Assumptions

HEAT applies several default values, but allows the user to overwrite these to use specific local context values. This is a key feature. For example, as HEAT is a European tool, the options of Canada and St. John's were not available for demographic inputs. For our assessment, we used a randomly selected city and country (Chesterfield, UK), and changed all default values to reflect provincial or national values. Values considered to represent the best possible scientific consensus (such as estimates based on numerous epidemiological studies) are referred to as background values and could not be changed.

As users of the tool, we also had to make our own assumptions about data entries, the most important of which were around travel volume and investment cost. In our calculation of total travel volume, the average number of trips per person per day for St. John’s, NL was unavailable, but was available for several other cities in Canada. The number of trips per person per day across 7 cities in Canada averaged to 3.5. This value became our best estimate of number of trips per day in St. John’s. Secondly, the specific value of investments into walking infrastructure were not separated and/or specified in the City’s 2019-2021 budget. Our estimation of current levels of investment into walkability in St. John’s are a combination of related investments like sidewalk snow clearing, sidewalk maintenance, etc. We assumed that the current level of spending on pedestrian network upkeep would be an appropriate estimation of the level of spending acceptable for pedestrian infrastructure.

RESULTS

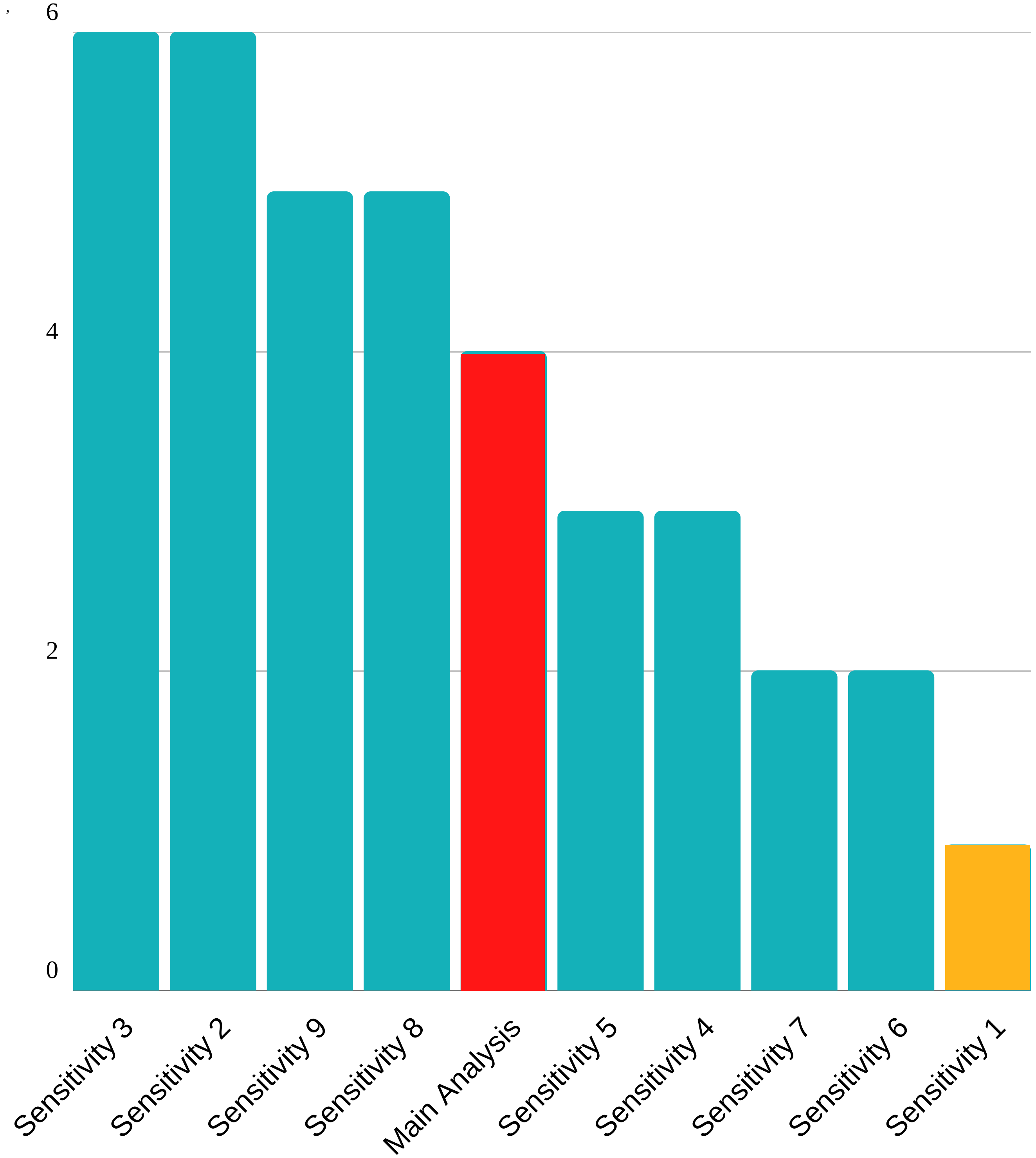
A doubling in walking mode share (4.6% to 9.2%) corresponds to an increase of 3 minutes per person a day of walking. When evaluating walking with HEAT, results are provided in:

1. Economic benefits
2. Benefits from physical activity
3. Carbon emissions avoided
4. Risk due to air pollution exposure

The economic impact of premature deaths prevented (or caused) in each category is calculated and used to determine a total benefit-cost ratio against the original investment cost. The benefit-cost ratio is the ratio of monetary gain against investment cost of a program or project. Any result greater than 1 is more beneficial than costly, and anything less than 1 is more costly than beneficial. This metric is used by decision-makers to justify the upfront cost of long-term projects. Figure 1 shows the estimated benefit-costs for the main scenario and all other scenarios.

The health economic benefits calculated by our analysis are largely driven by physical activity benefits and premature deaths prevented, rather than carbon emission reductions. Exposure to air pollution had minimal impact. Overall, the benefits of increased walking far out way the risk of increased exposure to air pollution.

Figure 1. Benefit-cost ratios for the main analysis and each scenario for HEAT in St. John's.

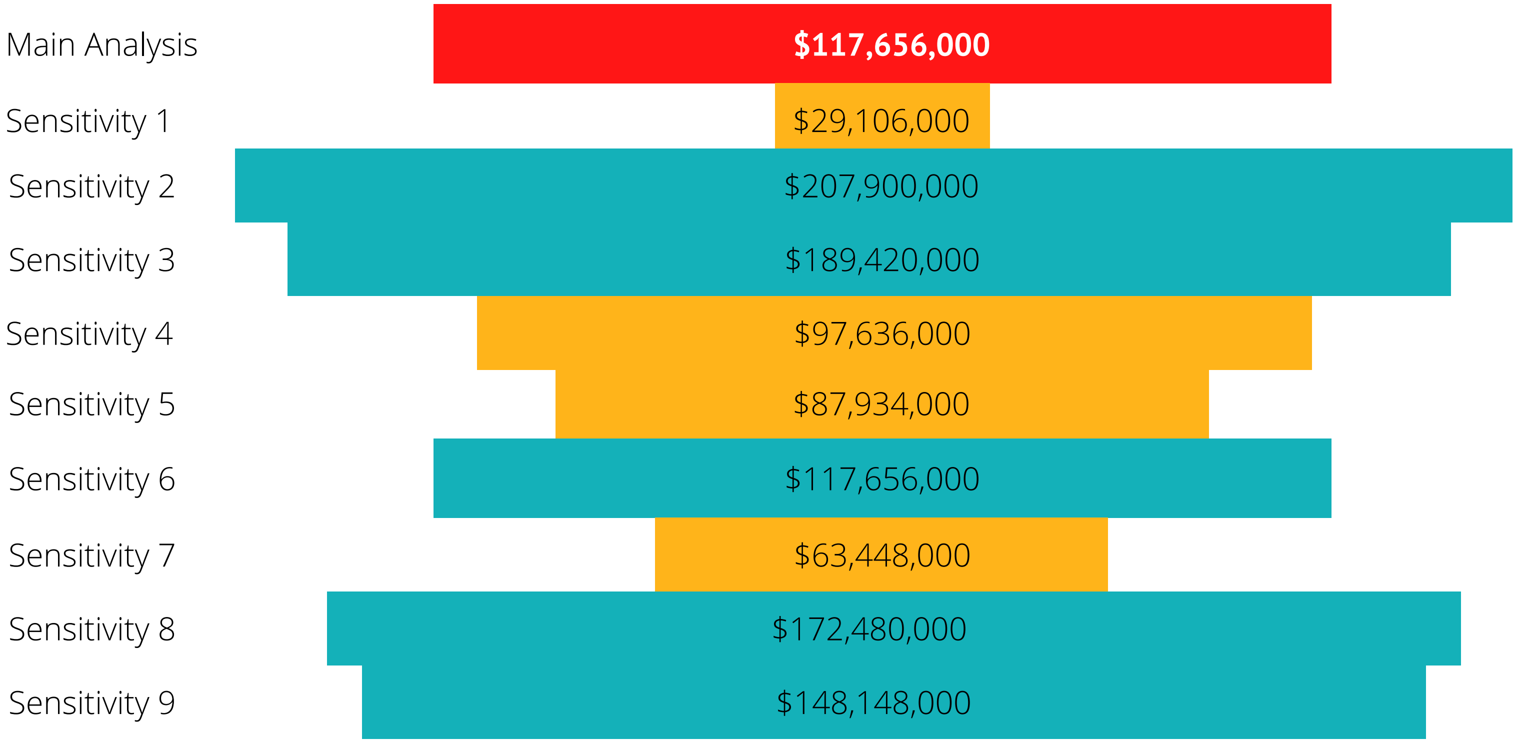


Note: Main analysis is highlighted in red. Yellow indicates sensitivity analysis with benefit cost ratios below 1.

Economic Benefits

The total economic benefit considers results from physical activity, air pollution, carbon emissions, and city demographics. We estimate an economic value of increasing walking mode share from 4.6% to 9.2% in St. John's to be $117,656,000. Considering a variety of possible inputs and outcomes, our estimates range from $29,106,000 to $207,900,000. Accounting for the cost of new infrastructure to support walking (~$3 million annually), we estimate a benefit-cost ratio of 4, meaning that the benefit is 4 times greater than the cost. Our estimates range from a benefit-cost ratio of 0.9 to 6. Figure 2 shows the estimated economic value for the main analysis and each scenario. Experience from other Canadian cities, including Calgary, Halifax, and Victoria, suggest that implementing separated cycling infrastructure in core employment centers can be successful for increasing cycling for transportation.

Figure 2. Estimated economic value for the main analysis and each scenario for HEAT in St. John's



Note. Main analysis is highlighted in red. Estimates with values below the main analysis are highlighted in yellow and estimates above the main analysis are highlighted in blue

Benefit-cost ratios have been calculated for several public health interventions and summarized in a systematic review.(26) In this review, they estimate that the median cost-benefit ratio for 29 different public health interventions was 10.3. Interventions that implement wider determinant interventions (like road infrastructure changes) had a mean benefit-cost ratio of 7.1, ranging from 0.66 to 23.6. This suggests that our results are in line with previous research on this topic.

Physical Activity

The increased population physical activity from walking an additional 3 minutes per person per day would prevent a total of 18 premature deaths over a 10-year time horizon. In our sensitivity analysis the range of prevented premature deaths was between 4 and 33. The reason physical activity is such an important factor is its strong association with many costly health conditions, like diabetes, cardiovascular disease, and mental illness. For example, the economic cost of diabetes in NL was projected to rise to $322 million annually by 2020.(1) Newfoundland and Labrador has the highest prevalence for these conditions in Canada.(1)

Air Pollution

All scenarios used provincial air pollution records for St. John's, NL, which averaged 4.85 µg/m3 between 2007 and 2016 (most recent data).(25) Air pollution results from HEAT measure the increased health risks of walking, due to increased exposure to unfiltered environmental air pollution (PM2.5). Over a 10-year assessment horizon, 0.2 premature deaths are caused by increased exposure to air pollution, costing $968,319.

Table 3. Results of all HEAT scenarios investigating the benefits of increased walking mode share in St. John's, NL

RESULTS

SCENARIOS	Premature deaths prevents (1 yr)	Premature deaths prevents (full time horizon)	Economic Impact (1 yr)	Economic Impact (full time horizon)	Benefit-cost ratio
Main Analysis	2	18	$13,090,000	$117,656,000	4
Sensitivity 1	0.9	4	$6,175,400	$29,106,000	0.91
Sensitivity 2	2	33	$16,016,000	$207,900,000	6
Sensitivity 3	3	29	$21,098,000	$189,420,000	6
Sensitivity 4	2	15	$10,903,200	$97,636,000	3
Sensitivity 5	1	14	$9,779,000	$87,934,000	3
Sensitivity 6	2	18	$13,090,000	$117,656,000	2
Sensitivity 7	2	18	$7,053,200	$63,448,000	2
Sensitivity 8	2	18	$19,096,000	$172,480,000	5
Sensitivity 9	2	18	$16,478,000	$148,148,000	5

Carbon Emissions

The main analysis and first 8 sensitivities exclusively measured the impact of increased walking, without a change in motorized transportation (driving or public transportation). Without a decrease in motorized transportation, carbon emissions will not be impacted (0 tonnes of CO2 decreased) and no economic or health impacts will be identified ($0 saved and 0 premature deaths prevented). Our 9th sensitivity analysis evaluated the role of decreased motor vehicle transportation due to increased walking. The carbon emission specific results of this analysis are outlined in Table 4.

Table 4. Sensitivity Analysis 9 Carbon Emission Results

	Result Values
Carbon emissions avoided (1 yr)	58,252 tonnes
Carbon emissions avoided (full time horizon)	582,516 tonnes
Economic impact (1 yr)	$3,326,400
Economic impact (full time horizon)	$30,492,000

We estimate that there would be 58,252 tonnes of carbon emissions avoided per year resulting in a net positive economic impact of $30 million per year from reduced carbon emissions.

Benefits & Limitations of HEAT

HEAT has many benefits. As a user-friendly and stakeholder-oriented tool, it balances ease of use with strong, evidence-based estimates of health and economic benefits. It is universal, as data inputs can be changed to reflect unique, context-specific environments. It considers both the benefits and risks of increased active transportation. This is unique, as many assessments may ignore the role of increased exposure to air pollution.

HEAT also possesses limitations. The tool only focuses on the influence of mortality and does not consider the impact of decreased morbidity. It solely focuses on populations between the ages of 20-74, excluding children and the elderly - populations which face increased risk of road injury and air pollution. For these reasons, results of the HEAT assessment are likely to be conservative estimates of the economic impact of increased physical activity.

DISCUSSION

Main Analysis

Our main analysis evaluated the health-economic impact of doubling the mode share of walking in St. John’s. If $3 million is invested annually into creating safe, accessible, and connected walking environments, the following results can be expected: a monetary gain of $109,543,084 (based on the value of statistical life - $6.5 million) and a benefit-cost ratio of 4. This means that the cost of investment in walking infrastructure is returning four times its value in premature deaths prevented. Doubling walking mode share in St. John’s would prevent 2 premature deaths per year and a total of 18 premature deaths over 10 years. Spending more than $3 million would result in further savings if walking continued to increase more than the 9.2% we projected for our scenarios.

Sensitivities

We applied a variety of sensitivity analyses to determine how the benefit-cost ratio, economic impact, and health impacts change with variations to physical activity levels, investment, uptake period, assessment horizon, and the value of statistical life. The variables that produced the most notably different results were:

1. Time horizon
2. Value of statistical life
3. Walking mode share target

Time Horizon

Sensitivity scenarios 1 and 2 highlight the impact of time horizon, evaluating effects over 5 and 15 years, respectively. Results of these sensitivity analyses (see Table 3) show that greater health and economic benefits occur over a longer time horizon. This provides important insight into the role of timeframe in the evaluation of infrastructure changes. It is unlikely that short term evaluation of walking infrastructure will yield positive results. Investing in walkable cities is a long-term commitment, with a significant upfront cost, but will result in a net positive economic impact if evaluated over a longer time horizon, as exemplified in our main analysis (10 year horizon) and sensitivity 2 (15 year horizon).

Value of Statistical Life

Sensitivity scenarios 7 and 8 focus on the impact of Value of Statistical Life (VSL),(24) using values lower ($3.5 million) and higher ($9.5 million) than the national value. As anticipated, the economic benefit was smaller when using a lower VSL, and vice versa. However, a notable observation should be acknowledged from sensitivity seven, lower VSL. Even with a VSL of half the national value, economic benefits are still achieved, exemplified by a benefit-cost ratio greater than one.

Walking Mode Share Target

Sensitivity scenario 3 focuses on the impact of walking mode share target, using a higher target of 12%, as opposed to 9.2%. Although doubling current mode share may appear to be a high target, several other Canadian cities with comparable population sizes and current walking mode shares to St. John's, strive for walking mode shares of 12% in their active transportation action plans. By increasing the goals around walking investment into walking infrastructure in St. John's can have a significant impact on health and economic benefits.

RECOMMENDATIONS

Given the ease of conducting this assessment and the desire for city-specific evidence, we suggest that cities should consider doing these assessments more often. We also suggest finding similarly user-friendly health impact assessment tools for other proposed municipal projects. That being said, not all of the above variables are appropriate targets for municipalities that wish to increase the walking mode share of their cities. In this section, we will use the above results and discussion to identify areas within municipal control. For example, while the VSL was a important variable in our sensitivity analysis, municipal governments do not control this value. Instead, this report can be used to highlight which areas of municipal control will have the greatest impact on walking mode share in St. John’s. These include the time horizon, the target mode share, and the investment cost.

As was noted above, results on time horizon highlight the importance of timeframe in the evaluation of new policies or programs developed to increase walking mode share in St. John’s. Take up time must be considered and accounted for in evaluation. Oftentimes, programs are implemented on a trial basis and re-evaluated after a short period of time. The extended pedestrian sidewalks were implemented for 1 month before being evaluated. The pedestrian mall is being implemented for 2 months before being evaluated. These evaluation timelines do not consider take up time and are not reflective of the findings from this report. To identify the health and economic benefits of increased walking in St. John’s, programs/projects/policies must:

1. Be implemented and evaluated for a longer period of time
2. Have clear data collection methods

The upfront cost of investment into walkable cities is often daunting, but long-term projections such as this are encouraging.

As noted above, many Canadian municipalities of similar population size and walking mode share have targets of 12% or higher. These goals are often outlined in a municipal active transportation master plan. Currently, the City of St. John's does not have a comprehensive active transportation plan or a target for walking mode share. Stating a target mode share communicates a level of commitment and prioritization to creating a walkable city. Results of this report provide evidence that higher targets (or established targets) lead to more walking. Higher targets should necessarily come with a higher investment.

CONCLUSIONS

Physical inactivity is a major concern in Newfoundland and Labrador. Walking is a cheap, easy, and accessible way to increase physical activity, decrease chronic health conditions, save on healthcare spending, and prevent premature morbidity and mortality. Investing in walkable cities is of health, environmental, and economic benefit to St. John's. WHO HEAT provides a user-friendly way to quantify the health-economic impacts of walking, using context-specific data inputs. The results of this analysis can be used to inform municipalities and encourage prioritization, commitment, and investment in active transportation infrastructure.

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