

IMPACT OF BUILT AND SOCIAL ENVIRONMENT INTERVENTIONS ON CHILDREN'S
ACTIVE TRANSPORTATION AND OUTDOOR PLAY IN NOVA SCOTIA

by

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Dalhousie University is situated in Mi'kma'ki,
the ancestral and unceded territory of the Mi'kmaq people.

As well, African Nova Scotians are a distinct people
whose histories, legacies, and contributions have enriched
that part of Mi'kma'ki known as Nova Scotia for over 400 years.

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ABSTRACT

Introduction: Healthy movement behaviours, including regular physical activity and reduced sedentary time, are important for children's health and well-being. However, Nova Scotian children fail to meet national 24-hour movement guidelines, necessitating increased opportunities for active transportation (AT) and outdoor play. Movement-friendly communities are crucial in supporting these behaviours. "Let's Get Moving Nova Scotia" is an action plan to create an active and healthier population. Related investments have enhanced built and social environments in communities in the province and are being assessed in the "Communities on the Move" evaluation. During phases 1 and 2 of the evaluation, differences in community-wide movement behaviours were assessed broadly across all age groups. **Purpose:** This study aimed to understand how built and social environment interventions have impacted children's AT and outdoor play in Nova Scotia by exploring the following research questions: (1) What differences do we observe in children's AT and outdoor play from phase 1 to phase 2? (2) Are there differences in AT and outdoor play at phase 1 and phase 2 by gender, and does the proportion of girls and boys engaging in AT and outdoor play change between these periods? (3) What factors underlie the observed changes in AT and outdoor play between phase 1 and phase 2, and what are the perceptions and experiences of these changes from community leaders and children? **Methods:** To evaluate children's AT and outdoor play, we used a mixed-methods explanatory sequential design. We conducted age- and gender-perceived counts of walkers, wheelers, and cyclists in key locations in communities and used the SOPARC tool (i.e., the system for observing play and recreation in communities) at two timepoints (T1: baseline; T2: one-year follow-up). We conducted a follow-up focus group and document reviews to contextualize the findings. Descriptive statistics and content analysis summarized quantitative and qualitative data, respectively. **Results:** Count and SOPARC findings showed variations in children's engagement in AT and outdoor play across community settings and genders. While two communities saw an increase in children's AT from phase 1 to phase 2, one experienced a decline. Although overall outdoor play decreased, observed activities showed higher physical activity intensities. A follow-up focus group emphasized the role of supportive built (e.g., sidewalks, bike lanes, traffic calming features) and social (e.g., parental support, perceptions of safety) environments in facilitating children's movement. **Conclusions:** Interventions targeting built and social environments yielded modest increases in children's AT and outdoor play. However, sustained evaluations are necessary to determine their long-term impact. Ensuring safe, well-connected AT infrastructure and accessible outdoor play spaces, alongside traffic safety measures are vital for fostering these behaviours. Social factors at family and community levels play a significant role in how the built environment is accessed and utilized; thus, combined interventions are pivotal for enhancing children's participation. Further research is needed to examine determinants of children's movement behaviours. As well, future research should explore gender-specific determinants to tailor more inclusive interventions. Lastly, future health promotion research, policy, and practice should incorporate children's voices and perspectives into the development of environmental interventions.

Keywords: Active transportation, outdoor play, children, healthy movement behaviours, built environment, social environment, Nova Scotia, mixed methods.

LIST OF ABBREVIATIONS USED

AT – Active transportation

CCTH – Department of Communities, Culture, Tourism, and Heritage

CoM – Communities on the Move

CSEP – Canadian Society for Exercise Physiology

HRM – Halifax Regional Municipality

METs – Metabolic Equivalents of Tasks

MPAL – Municipal/Mi'kmaw Physical Activity Leadership

MVPA – Moderate to Vigorous Physical Activity

MYM – Make Your Move

REB – Research Ethics Board

SOPARC – System for Observing Play and Recreation in Communities

SOPLAY – System for Observing Play and Leisure Activity in Youth

GLOSSARY

Active Transportation: Human-powered movement, including walking, wheeling, and cycling, with a goal of moving from one place to another.

Built Environment: Man-made spaces, structures, and features, including buildings, parks, walkways, roads, designed to support people's living, working, and recreational activities.

Children: Individuals 18 years of age or younger.

Gender: Socially and culturally constructed characteristics of girls and boys, women, and men; this includes constructed norms, behaviours, roles that varies from society to society and changes over time.

Healthy Movement Behaviours: Regular physical activity and limited extended periods of sedentary time, along with quality sleep.

Outdoor Play: Any type of play that occurs in outdoors settings, including natural and built environments.

Social Environment: The social supports, networks, relationships, and community and cultural contexts that surround and collectively influence an individual's behaviours, perceptions, and identity. This environment encompasses both direct interactions and broader, indirect influences of social norms, values, and structures.

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CHAPTER 1: INTRODUCTION

1.1 Background

Healthy movement behaviours, such as regular physical activity and limited sedentary time, are crucial for children's health and development and contribute significantly to overall health and well-being throughout the lifespan (Moore et al., 2020; Warburton & Bredin, 2017). In accordance, Canada has published 24-hour movement guidelines for children (Tremblay et al., 2016). These guidelines recommend children achieve at least 60 minutes of moderate to vigorous physical activity (MVPA) per day, several hours of light physical activity, limited periods of extended sedentary time, and between 8-11 hours of uninterrupted sleep per night to achieve optimal health benefits (Canadian Society for Exercise Physiology, 2021). Health benefits include decreased risk of cardiovascular mortality, obesity, and type 2 diabetes, along with improved emotional well-being and cognitive function (Bull et al., 2020).

Despite these recommendations, research indicates children living in Canada are not nearly active enough (Public Health Agency of Canada, 2018). Findings from the 2024 ParticipACTION Report Card on Physical Activity for Children and Youth, based on self-reported data from national surveys, show that only 39% of Canadian children are meeting the recommended amounts of physical activity outlined in the 24-hour movement guidelines (ParticipACTION, 2024). Moreover, the Report Card highlights significant gendered disparities, with boys (52%) being twice as likely as girls (26%) to meet the physical activity guidelines (ParticipACTION, 2024).

In the Province of Nova Scotia, trends in children's physical activity levels are similarly concerning. According to the most recent provincial-level data collected during the COVID-19 pandemic, only 21.3% of children aged 5-17 were meeting the physical activity

recommendations (Campbell et al., 2023). Pre-pandemic levels were also low; an accelerometry study of more than 1500 Nova Scotian high school students found that only 28% of boys and 13% of girls in grade seven, and just 5% of boys and 1% of girls in grade eleven, were meeting the physical activity recommendations over a typical five-day school week (Thompson & Wadsworth, 2012).

Promoting physical activity in childhood is critical as physically inactive children are more likely to be physically inactive in adulthood (Kallio et al., 2021). The Province of Nova Scotia especially experiences negative impacts of physical inactivity on population health outcomes; for example, a 2002 report estimated physical inactivity costs the province over \$107 million each year in direct medical expenditure (Colman et al., 2002). Furthermore, Nova Scotia's population reports higher rates of morbidity and mortality from chronic diseases associated with physical inactivity in comparison to national averages (Orzel et al., 2021). If we can intervene to increase movement in the early years, we may contribute to delays in chronic disease onset and decrease chronic disease prevalence. This, in turn, could significantly decrease healthcare expenditure and resources currently being directed towards chronic disease management in Nova Scotia (Province of Nova Scotia, 2021). Factors influencing movement behaviours of people living in Nova Scotia are multifactorial and vary across communities (Campbell et al., 2023).

One way to promote healthy movement behaviours in childhood is to increase opportunities for active transportation (AT). AT refers to human-powered movement, including walking, wheeling, and cycling, that involves a goal of moving from one place to another (Infrastructure Canada, 2021). For example, children may engage in AT for short commutes, travel to school, and leisure. AT has been associated with overall PA, improved health outcomes,

and significant social, economic, and environmental benefits (Infrastructure Canada, 2021; Public Health Agency of Canada, 2018). Outdoor play is also an important contributor to children's healthy movement. Engaging in active outdoor play develops children's physical literacy skills and increases children's likelihood of achieving the recommendations outlined in the 24-hour movement guidelines (Faulkner et al., 2015). Further, there is strong evidence to suggest outdoor play has additional benefits to being active indoors (Bento & Dias, 2017; Herrington & Brussoni, 2015; Tremblay et al., 2015). For instance, children are more likely to engage in physical activity when outdoors compared to indoors (Tremblay et al., 2015). Additionally, natural outdoor environments and nature-based playgrounds are associated with longer, more diverse, and more active play episodes than indoor environments or conventional playgrounds (Tremblay et al., 2015). Promoting children's AT and outdoor play offers a potential solution to managing Nova Scotia's high rates of chronic disease associated with physical inactivity, as this strategy addresses early life experiences that shape healthy movement following a life-course approach (Jones et al., 2019).

Children's engagement in healthy movement behaviours is influenced not only by individual-level factors, but also broader factors, such as their physical (built and natural) and social environments (Stappers et al., 2018). Research indicates that characteristics of the built environments, including the number and quality of sidewalks, separated bike lanes, parks and playgrounds, and the social environment, such as children and parents' perceptions of safety are major determinants of children's participation in AT and outdoor play (Mitra et al., 2014, 2020; Public Health Agency of Canada, 2018; Smith et al., 2017).

1.2 Statement of the Research Problem

Promoting children's healthy movement behaviours through AT and outdoor play requires supportive built and social environments (Faulkner et al., 2015; Mitra et al., 2014). However, built environments in Nova Scotia, especially in rural and low-density areas, often do not offer adequate support for AT (Habib, 2013; Jellicoe, 2015). Consequently, children living in Nova Scotia are spending increasing amounts of time indoors and sedentary (Province of Nova Scotia, 2018).

To address this, the province of Nova Scotia has released several policies and action plans to promote healthy movement, such as 'Let's Get Moving Nova Scotia', which builds on the current federal approach to support physical activity and reduce sedentary time (Province of Nova Scotia, 2018; Public Health Agency of Canada, 2018). In alignment with these goals, large investments are being made by provincial and municipal authorities for built and social environment interventions to support physical activity and movement (Province of Nova Scotia, 2023).

Examining the impacts of these interventions on children's levels of AT and outdoor play is crucial to understand the progress of investments and measure children's healthy movement in Nova Scotia. This would also help inform and strengthen future governmental and non-governmental policy, planning, and funding decisions to create healthy, active communities within Nova Scotia.

Additionally, research suggests there are gender-based differences amongst children's movement behaviours (ParticipACTION, 2024). Notably, girls living in Nova Scotia are typically less likely to engage in physically activity than boys, especially in late childhood and into adolescence (Province of Nova Scotia, 2018). Examining the gendered influence of built and

social environment intervention's is necessary to increase opportunities for *all* children to participate in physical activity and other healthy movement behaviours. Increasing opportunities and inclusion for children to participate in physical activity is not only a goal of both the provincial and federal 'Let's Get Moving' action plans, but also critical to achieving health equity (Province of Nova Scotia, 2018; Public Health Agency of Canada, 2018).

1.3 Study Purpose

The purpose of the proposed study is to examine the impact of built and social environment interventions on children's AT and outdoor play within Nova Scotia, Canada. In addition, this study aims to explore the distribution of impact across genders. The objective is to describe children's AT and outdoor play before and after built and social environment interventions in three specific Nova Scotian communities. The overarching goals of this study are to address gaps in the literature regarding the impacts of built and social environment interventions on children's AT and outdoor play in Nova Scotia and contribute to the Let's Get Moving federal and provincial goals of increasing opportunities and inclusion for participation in physical activity and measuring progress (as defined in A Common Vision for Increasing Physical Activity and Reducing Sedentary Living in Canada: Let's Get Moving, 2018; Let's Get Moving Nova Scotia, 2018).

1.4 Research Questions

This study extends from a larger mixed-methods evaluation of a program, Communities on the Move (CoM), which explores the potential of community-wide environmental and policy interventions to create a culture shift towards daily movement as a social norm in Nova Scotia. During phases 1 and 2 of the CoM evaluation, differences in community-wide movement behaviours were assessed broadly across all age groups. However, changes in children's

movement behaviours were identified as a group worthy of further inquiry. Thus, this study used secondary and primary data to examine the following research questions:

- (1) What differences do we observe in children's AT and outdoor play from phase 1 to phase 2?
- (2) Are there differences in AT and outdoor play at phase 1 and phase 2 by gender, and does the proportion of girls and boys engaging in AT and outdoor play change between these periods?
- (3) What factors underlie the observed changes in AT and outdoor play between phase 1 and phase 2, and what are the perceptions and experiences of these changes from community leaders and children?

1.5 Hypotheses

Three quantitative hypotheses were formed to explore the first two research questions listed above:

- (1) Children's levels of AT and outdoor play will increase from phase 1 to phase 2, and children will engage in more active outdoor play at phase 2.
- (2) At phase 1, girls will have lower engagement in AT and outdoor play and less active outdoor play, in comparison to boys. At phase 2, girls' and boys' engagement in AT and outdoor play and activity level during outdoor play will be more comparable.
- (3) There will be a larger proportion change between phase 1 and phase 2 in respect to girl's levels of AT and outdoor play and activity level during outdoor play, in comparison to the proportion change shown in boys between phase 1 and phase 2.

1.6 Thesis Outline

This thesis is organized in a monograph format, comprising of five chapters. Chapters are divided into an introduction to the study topic and the study's purpose, research questions and hypotheses (Chapter 1), a literature review framing the study within the broader field of health

promotion and outlining the study's theoretical framework (Chapter 2), a description of the study's methods (Chapter 3), a summary of study findings (Chapter 4), and lastly, a discussion of the study's potential implications for future research and practice as well as strengths and limitations (Chapter 5).

CHAPTER 2: LITERATURE REVIEW

This literature review begins by providing a critical analysis of the existing literature on environments supportive of movement, emphasizing their importance for children's health and development, and examining the status of these environments in Nova Scotia. Subsequently, it presents an analysis of the literature concerning children's movement behaviours and determinants of children's healthy movement. Following this, the review analyzes intervention strategies designed to promote children's healthy movement, assessing the literature regarding their measurement and evaluation. Finally, the review identifies gaps in the existing literature on these topics. The literature for this review was retrieved from various databases accessed through Dalhousie University's Novanet Catalogue and Google Scholar. Searches were performed using key terms and phrases related to the research topic, including, child-friendly environment(s), movement-friendly environment(s), AT, outdoor play, active play, determinants of children's healthy movement, movement behaviour(s), physical activity, sedentary behaviour(s), socioecological model (of health behaviours), built environment(s), social environment(s), community-wide intervention(s), interventions to promote children's AT, interventions to promote children's play, and interventions to promote healthy movement, etc.

2.1 Environments Supportive of Movement

Over the past century, cities and communities in North America have shifted towards automobile-centric planning and design, reducing the mobility of children and other non-motorists (Frohlich & Collins, 2024; Loebach & Gilliland, 2022). Today, with increased reliance on motorized transport and technology, movement has been largely engineered out of our daily lives, leading to an epidemic of physical inactivity and a rise in noncommunicable diseases such as obesity, diabetes, and cardiovascular conditions (Sallis et al., 2016).

To combat this shift, various ‘healthy city’ initiatives have emerged over the decades including age-friendly cities (focusing on the needs of the elderly), resilient cities (emphasizing sustainability and adaptability to climate change), child-friendly cities (ensuring safe and engaging spaces for children), and active cities (promoting overall physical activity through infrastructure and programs) (Brown et al., 2019; Sallis et al., 2016). More recently, the concept of play-friendly cities has been introduced, highlighting the importance of play and recreation spaces for children's physical and mental well-being (Caldwell et al., 2022).

A core of all these initiatives is the emphasis on city and community designs, programs, and policies that promote opportunities for movement and active living. Focusing on creating environments supportive of children’s movement is a valuable strategy for integrated action towards healthy cities and communities as environments that are healthy for children benefit everyone (Brown et al., 2019). Features commonly found in environments supportive of children’s movement include well-connected networks of sidewalks and bike lanes, ample and accessible green spaces and parks, and community centers (Brown et al., 2019; Caldwell et al., 2022; Gemmell et al., 2023; Han & Kim, 2018; Lee et al., 2021; Loebach & Gilliland, 2022). Additionally, safety elements such as traffic calming measures (e.g., speed bumps, speed limits, crossing guards, low traffic density), pedestrian paths and crossings, and maintenance of parks, sidewalks and bike lanes can help enhance the physical activity and independent mobility of children and non-motorists of all ages and abilities (Brown et al., 2019; Caldwell et al., 2022; Gemmell et al., 2023; Ghekiere et al., 2015; Rothman et al., 2018).

However, the voices of children are often excluded or overlooked in the planning and development of cities and communities. As highlighted by Loebach and Gilliland (2022):

“Despite an increased call for integrating youth into decision-making, urban planning processes still show little systemic integration of children’s voices, and youth needs remain significantly underrepresented in planning approaches (Bessell & Mason, 2014; Osborne et al., 2017). Planners and community developers must do more to work collaboratively with youth to plan communities that bolster positive neighborhood experiences for children across the full range of childhood and adolescence. To do so, planners need a stronger evidence base around children’s neighborhood activities and preferences to leverage the necessary practice and policy changes.” (p. 540-541)

Overall, creating environments supportive of movement requires a comprehensive approach that considers the needs of all community members. This involves collaborative efforts between urban planners, health officials, policymakers, and the community, including children, to design spaces that encourage movement and enhance overall well-being.

2.1.1 Status of Environments Supportive of Movement in Nova Scotia

Environments within Nova Scotia present barriers to children’s healthy movement. The two most populous municipalities in Nova Scotia, the Halifax Regional Municipality (HRM) and Cape Breton Regional Municipality have the highest amounts of AT infrastructure. However, many municipalities across the province have little to no bicycle lanes or sidewalks (Jellicoe, 2015). Additionally, Nova Scotia infrastructure prioritizes motorized modes of travel, resulting in limited accessible and safe choices for individuals who wish to engage in AT. For example, across the 10 most populous municipalities there is an average of only one meter of trail, bike lane, and sidewalk per capita, yet 150 meters of road per capita (Jellicoe, 2015).

Furthermore, Nova Scotia is a highly rural province with a population density of less than 0.5 people per acre in rural areas and 5.0 people per acre in suburban areas (Habib, 2013;

Jellicoe, 2015). The number of low-density populations in Nova Scotia makes AT infrastructure difficult to meet the needs of communities unless it covers large areas. Municipalities are often in charge of implementing and funding infrastructure interventions. Consequently, lower socioeconomic municipalities face challenges with AT infrastructure development and enhancement (Habib, 2013). Suburban and urban areas also face challenges within Nova Scotia as urban sprawl increases road infrastructure and reduces travel efficiency (Jellicoe, 2015). While, low population municipalities have higher amounts of walking and multi-use trails, urban areas like the HRM, have significantly more bike lanes, sidewalks, and higher street connectivity (Habib, 2013; Jellicoe, 2015).

Overall, findings from research conducted on movement friendly environments in Nova Scotia illustrate inequities to participation in movement friendly behaviours such as AT across the province. Rural areas have limited to no infrastructure that is supportive of AT, such as bike lanes and sidewalks, whereas urban areas have increased AT infrastructure and improved community design, such as higher street connectivity. Nonetheless, a car centric culture dominates the population's participation in healthy movement behaviours. For instance, a 2011 report found roughly 85% of NS commuters travel by car, 7% walked as a mode of commuting, and only 1% commuted via cycling (Habib, 2013). Furthermore, Canada's auto mode share for 11-17-year-olds increased by more than two-fold between 1986 to 2011 (Rothman et al., 2018). Clearly, significant interventions are needed to promote a culture of movement in Nova Scotia.

The lack of movement friendly environments across the province of Nova Scotia is significant because the places and spaces in which children inhabit influence health-related behaviours and health outcomes. Children living in areas that are rural, low-income, and/or sparsely populated experience inequities in access and opportunity to safe and accessible

physical activity. For example, living in a rural community with little to no properly paved sidewalks would lessen your ability to commute to destinations by mode of walking, especially if you experience mobility impairments. This in turn would decrease opportunities for regular physical activity and could contribute to negative health outcomes associated with physical inactivity. Additionally, for children, motorized forms of transportation are often inaccessible; therefore, their independence is decreased, and physical safety is at higher risk when participating in movement outdoors. Limited environments supportive of movement across the province may contribute to gender disparities as research suggests there are gender-based differences in children's movement behaviours (Voulgaris et al., 2015). Notably, girls living in Nova Scotia are less likely to engage in physically activity than boys, especially in late childhood and into adolescence (Province of Nova Scotia, 2018).

2.2 Children's Movement Behaviours

Numerous studies have evaluated the impacts of children's movement behaviours (physical activity, sedentary behaviour, and sleep) on health and well-being (Saunders et al., 2016; Tremblay et al., 2016; Wu et al., 2017). Current guidelines characterize movement behaviours along an intensity continuum, ranging from little to no intensity movement during sleep, to vigorous-intensity physical activity (Carson et al., 2015). The Canadian 24-hour movement guidelines created by the Canadian Society for Exercise Physiology (CSEP) has recommendations for daily movement behaviours based on the following age groups: early years (0-4 years of age), children and youth (5-17 years of age), adults (18-64 years of age), and older adults 65 years and above (Canadian Society for Exercise Physiology, 2021). CSEP recommends children and youth achieve at least 60 minutes of moderate to vigorous physical activity (MVPA) per day, several hours of light physical activity, limited periods of extended sedentary time, and

between 8-11 hours of sleep per night to achieve optimal health benefits (Canadian Society for Exercise Physiology, 2021). Health benefits include, but are not limited to, decreased risk of cardiovascular mortality, obesity, and type 2 diabetes, and improved mental health and cognitive function (Bull et al., 2020). Despite the well-documented benefits of healthy movement behaviours, a survey conducted in 2019 found 85% of Canadian children were not meeting the recommended amounts of physical activity outlined in the 24-hour movement guidelines (Mitra et al., 2020). More recently, findings from the 2024 ParticipACTION Report Card on Physical Activity for Children and Youth, which is based on self-reported data from national surveys, revealed that only 39% of Canadian children are meeting the recommended amounts of physical activity outlined in the 24-hour movement guidelines (ParticipACTION, 2024). The 2024 Report Card also highlighted significant gendered disparities, with boys (52%) being twice as likely as girls (26%) to meet the physical activity guidelines (ParticipACTION, 2024).

In the Province of Nova Scotia, trends in children's physical activity levels are similarly concerning. According to the most recent provincial-level data collected during the COVID-19 pandemic, only 21.3% of children aged 5-17 years were meeting the physical activity recommendations (Campbell et al., 2023). Pre-pandemic levels were also low, with notable gender difference. For example, an accelerometry study of more than 1500 Nova Scotian high school students found that only 28% of boys and 13% of girls in grade seven, and just 5% of boys and 1% of girls in grade eleven, were meeting the physical activity recommendations over a typical five-day school week (Thompson & Wadsworth, 2012). As a result, children living in Nova Scotia, particularly girls, are at higher risk for negative health outcomes.

Previous research has explored the impact of movement behaviours of all intensities on health (Tremblay et al., 2016). For example, Saunders et al. (2016) evaluated the impact of

integrated movement behaviours on health indicators in children. This was achieved through a systematic review of studies examining physical activity, sedentary behaviours, and sleep, with health indicators of adiposity, cardiometabolic biomarkers, self-esteem, quality of life/well-being, etc. In total only 13 cross-sectional studies and one cohort study met the study's inclusion criteria. Findings from this review suggest MVPA is most positively correlated with optimal health in children; however, the authors emphasize the need for future research using randomized control trial designs to strengthen evidence for this claim (Saunders et al., 2016). Additionally, Wu et al. (2017) performed a systematic review on the impact of physical activity and sedentary behaviours on health-related quality of life among a general population of children, with 31 studies that met inclusion criteria. The results illustrated a dose-response relationship between physical activity and health-related quality of life among children; although, the researchers noted longitudinal studies examining the effects of physical activity interventions on health-related quality of life of children are needed (Wu et al., 2017).

The two studies described above are notable as they suggest increases in regular physical activity have significant health promoting benefits in children. Health promotion strategies and interventions aiming to increase regular physical activity, particularly MVPA, could be effective at improving overall health and well-being among children, regardless of meeting the thresholds outlined in the Canadian 24-hour movement guidelines. Although, future quantitative research evaluating the impact of movement behaviours and physical activity interventions on overall health and well-being of children is needed to address gaps in the existing literature.

As aforementioned, movement behaviours are often categorized by where they fall on an intensity continuum, ranging from little to no intensity movement during sleep to vigorous-intensity physical activity. Health benefits associated with movement behaviours are influenced

by the intensity, as well as frequency, duration, and type of activity, summarized in the Canadian 24-hour movement guidelines (Canadian Society for Exercise Physiology, 2021). Sedentary behaviour refers to any waking behaviour that uses less than or equal to 1.5 metabolic equivalents of tasks (METs), this is low-intensity activity, such as sitting, lying down, or reclining for extended periods (Panahi & Tremblay, 2018). Moderate-intensity activity ranges between 3-5.9 METs, examples of moderate physical activity include walking, wheeling, and light effort cycling (Rey Lopez et al., 2020). High- or vigorous-intensity activity is greater than or equal to 6 METs, examples of vigorous physical activity include running, high effort cycling, and low volume strength training (Rey Lopez et al., 2020).

Existing literature on children's movement behaviours has focused primarily on the proportions of children meeting the 24-hour movement guidelines; by comparison, little research has been conducted on patterns of movement behaviours among children (Mitra et al., 2020). Understanding how children's movement behaviours vary and integrate throughout the day is important for informing health promotion policy and practice (Mitra et al., 2017). Previously, a compensation hypothesis has been the proposed framework for patterns of children's daily movement behaviours (Mitra et al., 2017). The compensation hypothesis suggests that high levels of physical activity in one part of a child's day, such as AT or play, will be compensated by lower levels of physical activity throughout the remainder of the day, resulting in stable levels of physical activity being performed over time (Mitra et al., 2017). For example, Voulgaris et al. (2015) found American high schoolers who actively transport to school spend less time exercising and participating in structured after-school activities than their peers. Findings from this study were derived from hierarchical cluster analysis performed on the American Time Use survey, examining patterns of physical activity among high schoolers. However, a 2017

quantitative study on the patterns of movement among 700 elementary students within Toronto Canada rejected the compensation hypothesis, reporting that children who engage in physical activity at any point in their day are more likely to be active throughout the day, in comparison to children that do not engage in any physical activity (Mitra et al., 2017).

Limited existing literature has examined the patterns and integration of children's movement behaviours. Although some studies have provided support for the compensation hypothesis to explain children's patterns of movement, other recent studies have reported contradictory findings (Mitra et al., 2017; Voulgaris et al., 2015). Namely, Mitra et al. (2017) argues that children who engage in any form of physical activity, including AT and play, are likely to continue to be active throughout the day. Future research needs to explore these findings and provide further evidence of support before conclusions can be drawn regarding patterns of children's movement behaviours. This is important for the field of health promotion as future research could help inform policy and practice to best support healthy movement behaviours among children.

2.2.1 Active Transportation

One way to promote children's healthy movement behaviours is to increase opportunities for AT. AT is human-powered movement including walking, wheeling, and cycling, that involves a goal of moving from one place to another. AT may be thought of only as a mode of commuting between destinations; however, it is any travel or movement of people powered by human activity and therefore can also be utilized as a form of exercise, recreation, or leisure (University of Alberta Centre for Active Living, 2017). For example, children may partake in AT when going for a walk around a park, and when walking or biking between home and school. Also, there exists seasonal forms of AT, such as canoeing, skateboarding, skiing. Although,

within the existing literature walking and biking are the most commonly studied forms of AT (Elliott et al., 2022). This could in part be due to the accessibility of walking and biking in comparison to other forms of AT (Mitra & Nash, 2017; Pollard & Wagnild, 2017).

AT is essential to children's optimal health and well-being (Frohlich & Collins, 2024). Systematic reviews reveal that children who have independent mobility and engage in AT accumulate more physical activity and are more like to meet physical activity guidelines than those who do not (Faulkner et al., 2009; Larouche et al., 2018; Schoeppe et al., 2013). In addition, AT to and from school offers immediate and lasting benefits for children's physical activity, social interaction, and overall health (Rothman et al., 2018). For example, children who cycle to school exhibit greater levels of alertness and activity during school hours compared to those who travel by car (Westman et al., 2013). AT to school is also linked to better cardiometabolic health, mood, and school grades (Larouche & Ghekiere, 2018). Moreover, AT can increase children's independence, social development, and time spent exploring outdoors (Hillman, 2006; Hillman et al., 1990). Engaging in AT in childhood is important as it is associated with sustained physical activity into adolescence and adulthood (Carver et al., 2011; Telama et al., 2005). Therefore, promoting AT in childhood could serve as an effective life course approach to preventing physical inactivity and associated negative health outcomes later in life (Jones et al., 2019). However, studies suggest that AT among children in Canada peaks in late childhood and then declines during adolescence (Buliung et al., 2009; Pabayo et al., 2011). Although AT is a predictor of continued physical activity into adulthood, it could be hypothesized that the use of motorized transport may replace AT with other forms of physical activity during adolescence; however, more research is needed before conclusions can be drawn.

Concerningly, over recent decades the prevalence of children's AT has decreased internationally (Aubert et al., 2021).

Adding to this concern, research suggests significant gender differences in children's AT participation (Mitra & Nash, 2017; Yuan et al., 2022). Boys are generally more likely to bike and slightly more likely to engage in AT across all destinations than girls (Mitra & Nash, 2017; ParticipACTION, 2020). For example, Mitra & Nash (2017) found that female post-secondary students in Toronto cycled less than their male counterparts, both for commuting to school (6.8% versus 10.3%) and for non-commuting purposes (7.9% versus 11.6%). Additionally, when comparing pre-pandemic and pandemic levels of AT (2018 to 2021), girls experienced a greater decrease than boys (ParticipACTION, 2024). It is important to note that within this discussion of gendered differences in AT participation, the identities examined are limited to boys and girls, which does not reflect the experiences of gender-diverse individuals and their participation in AT. Societal gender norms and relations continue to shape access to AT and health outcomes (Yerkes et al., 2020; Yuan et al., 2022). Therefore, examining existing literature provides crucial insights into gender and AT, potentially informing targeted interventions to reduce disparities in AT participation and health.

Regional variations in AT participation are also evident. Findings from the 2022 and 2024 ParticipACTION Report Cards indicate that the percentage of children who actively commute to or from school increases with community size (ParticipACTION, 2022, 2024). Additionally, children who live closer to school are more likely to use AT compared to those who live farther away (ParticipACTION, 2020). Variations by province were also observed during the COVID-19 pandemic, where children in Quebec, Ontario, and the Prairies experienced declines in AT levels, while children in Atlantic Canada and British Columbia

maintained stable AT levels (ParticipACTION, 2024). Research suggests that less severe declines in children's movement in Atlantic Canada compared to other regions may be due to fewer COVID-19 cases and outdoor restrictions (Campbell et al., 2023). These findings highlight the importance of considering regional and community-specific factors when designing interventions to promote AT among children.

2.2.2 Outdoor Play

Outdoor play is another important contributor to children's healthy movement. Defined in a systematic scoping review by Lee et al. (2022) outdoor play is, "a form of play that takes place outdoors which involves physical activity of any intensity." A large body of literature supports the benefits of outdoor play on children's physical, social, and cognitive, and motor abilities (Bento & Dias, 2017; Gundersen et al., 2016; Milligan & Bingley, 2007). For example, engaging in outdoor play develops children's physical literacy skills and increases children's likelihood of meeting the 24-hour movement guidelines (Faulkner et al., 2015). Further, there is strong evidence to suggest outdoor play has additional benefits to being active indoors (Bento & Dias, 2017; Herrington & Brussoni, 2015; Tremblay et al., 2015). Children are more likely to engage in physical activity when outdoors compared to indoors (Tremblay et al., 2015). Additionally, natural outdoor environments and nature-based playgrounds are associated with longer, more diverse, and more active play episodes than indoor environments or conventional playgrounds (Tremblay et al., 2015). Unstructured outdoor play has added benefits, promoting children's autonomy, problem-solving, and self-confidence (Bento & Dias, 2017; Gemmell et al., 2023; Ramsden et al., 2024). Despite evidence for the benefits of unstructured outdoor play, research suggests children's opportunities for outdoor play have been decreasing, replaced by more

organized and privatized forms of recreation, typically occurring indoors (Barnes et al., 2013; Gray, 2011; Tremblay et al., 2015).

Furthermore, like AT, disparities in children's outdoor play participation exist, influenced by factors such as age, gender, and geography. For instance, the 2024 ParticipACTION findings show that girls living in suburban or rural areas are twice as likely to spend over two hours outside on weekdays compared to girls living in urban areas; however, these differences were not observed in boys (ParticipACTION, 2024). Additionally, during the COVID-19 pandemic, children living in regions with fewer COVID-19 cases and fewer restrictions on outdoor spaces, such as in Atlantic Canada, experienced smaller declines in outdoor play (Locke et al., 2024). Research also suggests that younger children are more likely to engage in active play and spend time outdoors than older children (ParticipACTION, 2024). These disparities highlight the need for targeted interventions that address specific barriers to outdoor play for different groups of children.

2.3 Determinants of Children's Healthy Movement Behaviours

To foster children's participation in movement behaviours for health, health promoters must take into consideration factors that influence children's healthy movement behaviours, also known as determinants of healthy movement. Research on determinants of children's healthy movement, such as walking, wheeling, cycling, and play are well-documented (Mitra et al., 2020). In particular, the COVID-19 pandemic offered researchers a unique opportunity to explore children's healthy movement behaviours following changes to their social and physical environments (Arbour-Nicitopoulos et al., 2022; Knight et al., 2022; Mitra et al., 2020; Moore et al., 2020). Within the past 30 years of health promotion research, four key frameworks have been introduced and studied to understand determinants of movement behaviours: the social cognitive,

humanistic, dual-process, and socioecological frameworks (Rhodes et al., 2019). An in-depth discussion of this literature is beyond the scope of this review, but notably, the socioecological framework has been the most influential on informing public health policy and is important for contributing to researchers understanding of the role social and physical environments play in shaping children's healthy movement behaviours (Rhodes et al., 2019). Accordingly, this review of the existing literature concerning the determinants of children's healthy movement will focus on the application of socioecological model to understanding health behaviours.

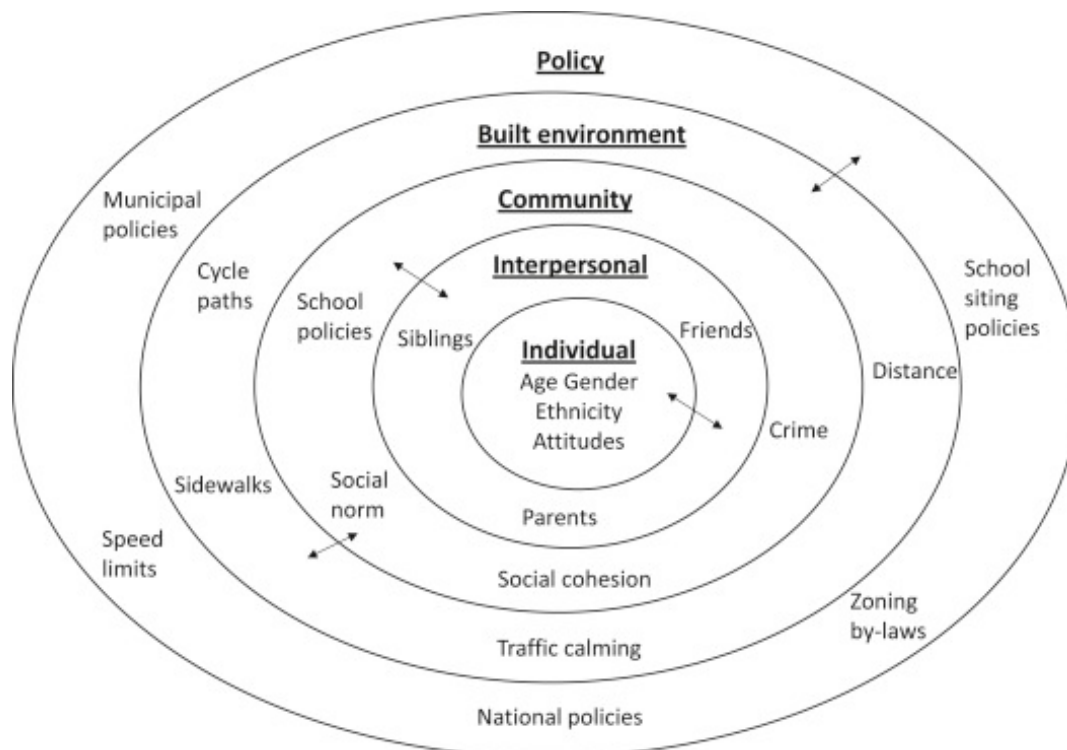
2.3.1 The Socioecological Model

Over the last two decades, the application of the socioecological model to health behaviours have risen in popularity within the existing literature (Rhodes et al., 2019). These models highlight the role of environmental and social factors, such as neighborhood-built environment and gender norms, in influencing population-level healthy movement behaviours (Mitra & Manaugh, 2020; Rhodes et al., 2019). Previous quantitative research on children's movement using this framework provides evidence supporting the neighborhood-built environment's influence on a variety of healthy movement behaviours, including AT (walking, wheeling, cycling), outdoor play, and independent mobility (Faulkner et al., 2015; Mitra et al., 2014; Mitra & Nash, 2017; Smith et al., 2017). Additionally, qualitative studies and systemic reviews have shown social factors including parental attitudes and perceptions of safety are key correlates in promoting children's AT and outdoor play (Lee et al., 2021; Loebach & Gilliland, 2022).

Salvo et al. (2021) emphasize the need for physical activity promotion strategies to resolve socioeconomic and gender inequalities in physical activity participation. Although existing literature is limited, research on sociodemographic differences in children's movement

patterns suggest males are more active than their female peers (Mitra & Nash, 2017; Voulgaris et al., 2015). Therefore, future research should examine the influence of gender when studying children’s movement behaviours to develop health promotion interventions that reduce health inequalities. Larouche and Ghekiere (2018) have created a socioecological model of AT that illustrates gender as an individual-level factor of influence (see figure 1).

Figure 1. *Ecological Model of Active Transportation*



Note. From, “Ecological model of active transportation” (Larouche & Ghekiere, 2018). Retrieved from <https://doi.org/10.1016/B978-0-12-811931-0.00006-5>

Socioecological models are commonly used in health promotion practice, as they inform comprehensive multi-level interventions that address complex health issues (Kellou et al., 2014). For example, Naylor et al. (2006) use a socioecological approach to highlight the importance of the school environment for promoting physical activity and health among school aged children in British Columbia. The result of which improved school and provincial action towards promoting

health behaviours in children. Overall, the socioecological model provides insight into environmental and social factors that influence children's healthy movement and informs health promotion policies and programs that reduce inequalities in health related to physical activity participation. Resultantly, the socioecological model serves as the underlying framework for the present study.

2.4 Intervention Strategies to Promote Children's Healthy Movement

Promoting healthy movement among children is critical for their proper health, well-being, and lifelong development. Various intervention strategies have been explored to address children's physical inactivity and promote healthy movement behaviours such as AT and outdoor play. Interventions for children's healthy movement usually target various socioecological levels of influence including built environment interventions, social environment interventions, policy interventions, and multicomponent interventions.

2.4.1 Built Environment Interventions

Considerable empirical evidence supports the notion that the built environment influences participation in healthy movement behaviours (Smith et al., 2017). Kaklauskas and Gudauskas (2016) describe the built environment as:

“The human-made surroundings that provide the setting for human activity, ranging in scale from buildings and parks or green space to neighborhoods and cities that can often include their supporting infrastructure, such as water supply or energy networks. The built environment is a material, spatial, and cultural product of human labor that combines physical elements and energy in forms for living, working, and playing.” (p. 413-449)

Research has shown built environment characteristics such as, neighborhood walkability, availability of play spaces, and quality of infrastructure for AT shape children's AT, outdoor play, and overall physical activity participation (Caldwell et al., 2022; Mitra & Nash, 2017; Salvo et al., 2021). Defined by Omura et al. (2020), the aim of built environment interventions is, "to create or modify community environmental characteristics to make physical activity easier or more accessible for all people in the places where they live." These interventions commonly include improving urban design and neighbourhood connectivity, increasing pedestrian and bike infrastructure, as well as park and play spaces, and enhancing the availability and accessibility of physical environments (Heath et al., 2012; Omura et al., 2020; Zhang et al., 2022). A systematic review on the built environment effects on physical activity and AT reported interventions improving neighborhood walkability and AT infrastructure generate positive impacts on the physical activity of both children and adults (Smith et al., 2017). Additionally, Salvo et al. (2021) suggests strategies centering around infrastructure changes that support walking and cycling are effective at increasing participation in AT and physical activity.

However, the cost and complexities involved in objectively measuring the impact of neighborhood build environment interventions on AT, outdoor play, and overall physical activity has resulted in a lack of quality research on the topic (Smith et al., 2017). Until recently, most studies were cross-sectional in design; in comparison, longitudinal studies and pre- and post-intervention comparisons are of limited quantity (Smith et al., 2017; Zhang et al., 2022). There is some evidence to suggest built environment interventions have positive effects on healthy movement behaviours among children, but studies lack consistent measures, and the quality of evidence is low (Larouche & Ghekiere, 2018). As well, gaps remain in the existing literature regarding the distribution of health and movement impacts after built environment interventions

across populations (Smith et al., 2017). For instance, whether the impact of built environment interventions contribute to inequalities in health is relatively unknown. Consequently, quality evidence to support the positive impact of built environment interventions on children's healthy movement behaviours and the distribution of impact across populations is needed (Smith et al., 2017).

In Canada, outside of large urban locations the neighborhood-built environment's impact on children's patterns of movement remain understudied (Mitra et al., 2020). In Nova Scotia for example, studies on built environment correlates of healthy movement are primarily explored within the HRM, the capital and largest municipality in the province (Habib, 2013). Existing literature on the impact of built environment interventions that support children's healthy movement behaviours across Nova Scotia is extremely limited.

2.4.2 Social Environment Interventions

Social environments also play a crucial role in shaping children's healthy movement behaviours. While there is no universal definition of 'social environments', Ayala et al. (2021) describe them as, "A child's social environment is made up of family members, peers, teachers, and so on (i.e., network members), individuals who exert direct and indirect influences on the child." These environments can influence children's movement by, "shaping norms, enforcing patterns of social control, providing or not providing environmental opportunities to engage in particular behaviours, reducing or producing stress, and placing constraints on individual choice" (Institute of Medicine, 2002). Some evidence suggests characteristics of children's social environments are the most important influences on their physical activity engagement (Ayala et al., 2021; Berge & Saelens, 2012). For example, an international study examining the relationship between physical activity and social, physical, and policy environments using self-

reported questionnaires found the social environment was the strongest independent predictor of being physically active (Ståhl et al., 2001). However, similar to above, stronger study designs and specificity of measures are required to strengthen this evidence base (Timperio et al., 2015).

Interventions targeting the social environment often include parental involvement, school- and community-based programs, and education and encouragement initiatives (Caldwell et al., 2022; Heath et al., 2012; Larouche & Ghekiere, 2018). According to a systematic review by Van Sluijs et al. (2007), school-based interventions that include a family or community component are more effective in increasing children's physical activity levels compared to those that do not. Bicycle training programs, where children are provided knowledge and training on how to bicycle, have also been shown to be effective at increasing children's AT to school (Schönbach et al., 2020). Also, Miranda et al. (2017) highlighted that social support from peers can enhance children's involvement in outdoor play. Therefore, strategies that enhance parental and social support, promote role modeling among teachers, parents, and peers, and increase the availability of physical activity programs can be effective in boosting children's engagement in AT and outdoor play.

It is also important to consider other social environment factors, such as social and cultural norms, in shaping children's movement behaviours. These norms can influence how children engage in AT and outdoor play, by affecting their perceptions of, access to, and participation in these activities. Research indicates that societal norms surrounding gender can influence the types and frequency of physical activities children participate in, with boys often engaging more in AT and active play compared to girls (Kretschmer et al., 2023; Mitra & Nash, 2017). Cultural attitudes and gender-specific stereotypes can further influence children's engagement. For example, some culture may provide greater encouragement for boys to

participate in structured and unstructured physical activity, while girls may face more constraints or less encouragement (Rio & Saligan, 2023). These cultural norms not only shape the types of activities children engage in but also affect their overall physical activity levels and perceptions of what is safe and socially acceptable. Therefore, social environment interventions should consider social norms and cultural contexts to create supportive and inclusive environments that encourage children's healthy movement behaviours. This includes promoting gender equity in AT and outdoor play opportunities and fostering a culture of movement for all children.

2.4.3 Policy Interventions

Policy interventions at the local, community, and national level are necessary to ensure children have supportive environments for AT and outdoor play (Caldwell et al., 2022). Municipal governments have a particularly important role in supporting children's healthy movement through policy action as they have authority in key areas such as land use planning, infrastructure, and community facilities and programming (Caldwell et al., 2022). For example, Safe Routes to School initiatives have been shown to increase children's walking and biking to school by improving infrastructure and safety (Stewart et al., 2014). Additionally, policies that mandate recess and outdoor playtime in schools contribute to higher levels of physical activity among children (Ariz et al., 2022). These policies help establish and uphold practices that promote regular AT and outdoor play across populations.

The province of Nova Scotia has several policies and action plans to promote children's healthy movement. For instance, 'Let's Get Moving Nova Scotia' is the provincial action plan for increasing physical activity (Province of Nova Scotia, 2018). This plan outlines actions for communities to develop policies that facilitate daily unstructured movement, such as AT, and create conditions that promote outdoor play (Province of Nova Scotia, 2018). Furthermore, this

action plan builds upon the current federal approach to support physical activity and reduce sedentary time (Public Health Agency of Canada, 2018).

2.4.4 Multicomponent Interventions

Multicomponent interventions combine one or more elements of built environment, social environment, and policy interventions. For health promotion interventions, a singular approach is often insufficient, and a holistic strategy is necessary to create sustainable behaviour change (Laverack, 2017). These types of interventions are most effective as they address multiple socioecological determinants of children’s healthy movement simultaneously. For example, Young et al. (2020) suggest combined policy, systems, and environmental interventions that promote AT as the leading strategies to increase physical activity, regardless of individual correlates, such as age and gender. Additionally, the national and provincial ‘Let’s Get Moving’ action plans focus on a socioecological model for health promotion, recommending comprehensive approaches that target the physical, social, and policy factors influencing movement behaviours (Province of Nova Scotia, 2018; Public Health Agency of Canada, 2018).

Considerable evidence supports the cost-effectiveness of population- and community-wide built and social environment interventions for promoting physical activity, emphasizing the importance of addressing these factors at a broad level to achieve widespread benefits (Allender et al., 2020; Laine et al., 2014). Promoting physical activity at the population level is crucial because it can address systemic barriers and create environments that encourage regular movement among diverse groups of people (Heath et al., 2012). This approach is particularly relevant for promoting healthy movement behaviours, such as AT and outdoor play, which are key components of children’s daily physical activity.

Previous environmental and policy interventions at the population level have reported promising results in relation to community-wide healthy movement behaviours and community well-being. For instance, the 2009 Albert Lea Blue Zone project involved a multifaceted intervention that focused on changes to the built environment, community policies, and social norms (Marston et al., 2021). The evaluation of this project reported increased levels of physical activity among community residents and improvements in overall well-being (Marston et al., 2021). Similarly, the Voorstad on the Move program in the Netherlands, grounded in the socioecological perspective, successfully enhanced healthy behaviours, social connections, and participants' sense of meaning by integrating community-wide strategies to encourage active living (Jong, 2022). These examples highlight how population-wide interventions can effectively increase physical activity and movement, contributing to broader public health goals. However, evaluating such interventions can be challenging, as it is often difficult to isolate the effects of specific components and distinguish what the results are attributed to (Sallis et al., 1998). Despite these challenges, understanding the outcomes of these interventions is crucial for tailoring strategies and improving their effectiveness in promoting healthy movement at the population level.

2.5 Measurement and Evaluation of Movement Interventions

The measurement and evaluation of movement interventions are critical to understanding their efficacy and impact (Sallis, 2010). Further, measuring progress of interventions and investments is a strategic priority of both the national and provincial 'Let's Get Moving' action plans (Province of Nova Scotia, 2018; Public Health Agency of Canada, 2018). Various methods have been utilized to assess these interventions, including both quantitative and qualitative measures and evaluations.

Quantitative methods often involve the use of self-reports, accelerometers, pedometers, and direct observations (Sallis, 2010; Troiano et al., 2008). Accelerometers and pedometer devices provide precise data on the intensity, duration, and frequency of physical activity; however, they are also resource-intensive and have variable accuracy for children (Hildebrand et al., 2014; Sallis, 2010; Strath et al., 2012). While self-reported questionnaires and surveys are the most frequently used method to measure children's outdoor play and independent mobility as they are cost-effective and easy to administer, they have very low accuracy and reliability (Prince et al., 2008; Ramsden et al., 2024; Sallis, 2010). Conversely, direct observations are the most frequently used method to assess physical activity of populations in settings (Sallis, 2010). Observations are beneficial as they allow for high-quality data to be gathered on multiple dimensions of the target population and the physical activities being performed (Sallis, 2010). However, they require human observers, training, and may be impacted by observer bias and participant reactivity effects (Sallis, 2010).

Qualitative methods also play a significant role in measuring and evaluating movement interventions. Interviews and focus groups can provide in-depth insights into children's experiences, perceptions, and barriers to healthy movement (Kirby et al., 2013; Pearce et al., 2009; Zhao et al., 2024). These methods help to understand the contextual and environmental factors that influence the success of interventions (Howarth et al., 2016). For instance, the use of focus groups has been shown to reveal the social and environmental contexts influencing children's engagement in physical activities, such as lunchtime play (Stanley et al., 2012).

Mixed method approaches, integrating both quantitative and qualitative methods, are increasingly recognized for providing a comprehensive evaluation of health interventions (Creswell & Plano Clark, 2011). Mixed methods evaluations can offer a more holistic

understanding of the impact of complex interventions as quantitative data assessing the magnitudes of change can be combined with qualitative insights to understand the contextual insights and diverse experiences of participants (Regnault et al., 2018). Additionally, this approach allows researchers to triangulate data, enhancing the validity and reliability of their findings (Fetters et al., 2013). In the context of movement interventions, applying a mixed methods approach not only assesses the effectiveness of the intervention in changing physical activity levels, but the underlying mechanisms and reasons for these changes. This comprehensive approach is beneficial as it can inform the design and implementation of movement interventions that better address the unique needs, experiences, and contexts of target populations.

Longitudinal studies are another important component of measuring and evaluating movement interventions (Molloy & Woodfield, 2002). These studies track outcomes over extended periods, providing valuable information on changes over time and the sustainability of intervention effects (Caruana et al., 2015). However, most studies examining the correlates of healthy movement and the impact of movement interventions have adopted a cross-sectional design as opposed to longitudinal (Bauman et al., 2012; Lee et al., 2021; Smith et al., 2017).

2.6 Gaps in the Literature

Despite substantial research on movement-friendly environments and determinants of children's healthy movement, several gaps remain. Notably, there is a lack of standardized approaches and quality evidence in previous examinations of the determinants of children's engagement in healthy movement behaviours, including gender correlates. Comprehensive studies evaluating the long-term impact of environmental interventions on children's movement behaviours are also limited. Furthermore, research specifically within the geographical context of

Nova Scotia is minimal, highlighting the need for localized studies that consider the unique social and environmental factors of this region. Additionally, there is a need for more research on the gendered impacts of these interventions.

2.7 Summary

This review contextualizes the study within the broader literature. It highlights that despite ample knowledge about movement friendly cities/communities and determinants of children's healthy movement, the quality of evidence is low, and gaps remain in assessing the impact of built and social environment interventions aimed at promoting healthy movement on children's engagement in these behaviours, including gendered impacts. These gaps are particularly evident within the geographical context of Nova Scotia. Also, this review situates the study within the field of health promotion, underscoring its importance for building knowledge on factors that influence children's health and well-being across the lifespan. It also explores potential implications of findings on future health promotion research, policy, and practice.

CHAPTER 3: METHODOLOGY

This chapter describes the methodological assumptions, theoretical perspectives, and mixed-method design guiding this research. This chapter also elaborates on my positionality and reflexivity as the researcher guiding this study. Subsequently, this chapter provides background information regarding the larger CoM evaluation, followed by an in-depth overview of the quantitative and qualitative phases of study. Finally, this chapter explores ethical considerations and methodological limitations of this research.

3.1 Conceptual Framework

3.1.1 Methodological Assumptions

This thesis is guided by a pragmatic worldview. A worldview is a larger philosophical stance that one holds regarding the world and the approach to research (Creswell & Creswell, 2019). It has alternatively been termed as a paradigm (Guba et al., 2011), encompassing ontology and epistemology (Crotty, 1998), or a broad conception of research methodology (Neuman, 2011). A researcher's worldview serves as a compass, directing and influencing their practice of research (Creswell & Creswell, 2019). With a pragmatic worldview, the researchers focus is on addressing the research problem and question(s) in its social and historical context, rather than focusing solely on the research method (Evans et al., 2011). Pragmatist scholars reject the idea that social science research can assess reality using a single scientific method, therefore pragmatists can freely choose methods and procedures based on what best suits their needs and the research purpose (Creswell & Creswell, 2019; Kaushik & Walsh, 2019). Unlike other philosophical worldviews, pragmatism acknowledges that reality can never truly be determined (Kaushik & Walsh, 2019), as meaning is inseparable from human experience, needs, and the contexts in which it occurs (Dillon et al., 2000). Instead, a pragmatist researcher chooses

what reality is ‘true’ based on how well that choice works at the time and helps to achieve their purpose (Kaushik & Walsh, 2019). In research, a pragmatist worldview encourages pluralistic approaches to understand the research problem, thus it is a philosophical underpinning for mixed methods studies (Creswell & Creswell, 2019). However, pragmatism is not indicative of mixed methods. Pragmatic researchers must have a rationale as to why quantitative and qualitative methods need to be mixed to achieve the research purpose (Creswell & Creswell, 2019).

3.1.2 Theoretical Perspectives

According to Creswell and Creswell (2019), a social science theory can provide a comprehensive framework for pragmatic studies using a mixed-method design. The utilization of theoretical frameworks benefits mixed methods studies by providing organizational structure, as (Evans et al., 2011) suggest:

“Clearly, such frameworks could assist with navigation in mixed methods studies consisting of concurrent or sequential investigations, facilitate integration of methods in at least one phase of the inquiry, and provide a map for combining the what with the why to gain a multidimensional understanding of causal mechanisms.” (p. 278)

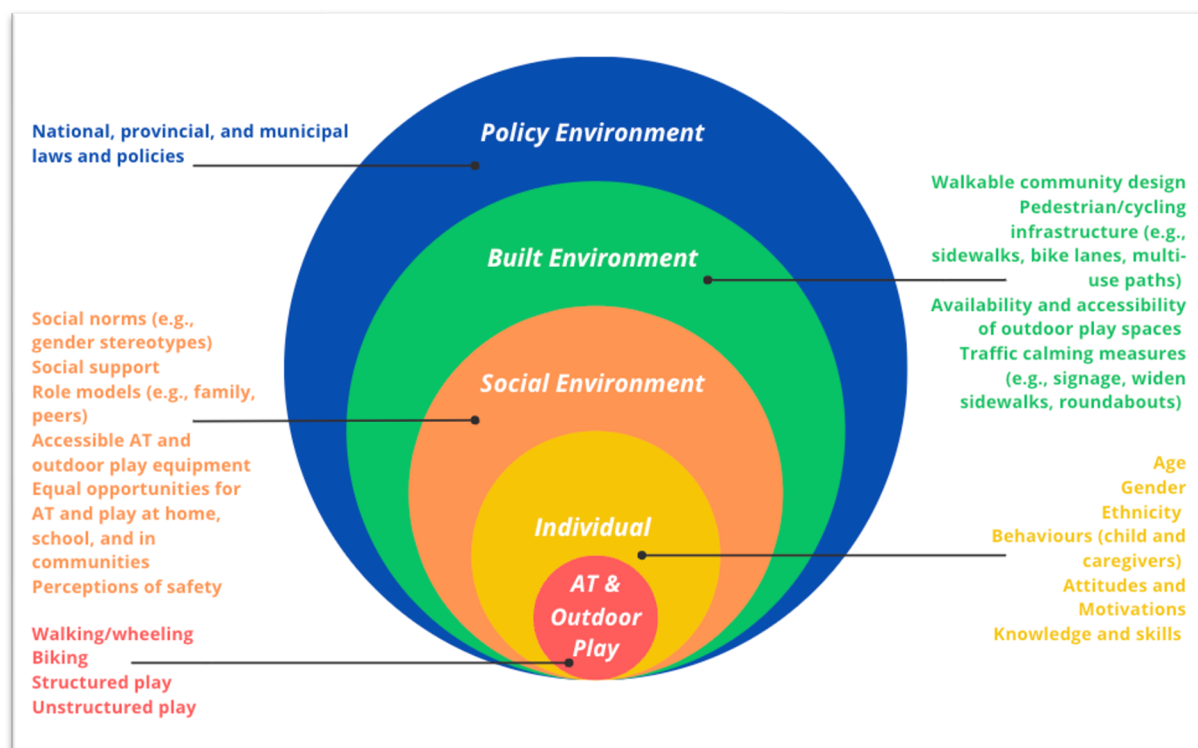
In particular, the use of social science theories as logical guidance is essential for complex studies that aim to assess behaviour change resulting from interventions, identify factors that influence change, and offer rapid, indirect assessments of population-level indicators when interventions must be implemented at a narrower scope and evaluation of long-term outcomes takes time (Evans et al., 2011).

For this study, the socioecological model served as a theoretical framework. Originating from the work of Bronfenbrenner (1979) and McLeroy et al. (1988), this model offers a visual representation of the multi-level determinants of health behaviours, encompassing individual,

social, and broader environmental factors. It has significantly influenced health promotion policy and practice, particularly in addressing health disparities associated with physical activity participation (Mitra & Manaugh, 2020; Rhodes et al., 2019).

In this research, the socioecological model sheds light on the influence of built and social environments on children’s engagement in AT and outdoor play (see figure 2).

Figure 2. *Socioecological Approach to Understanding Children's Participation in AT and Outdoor Play*



Note. Adapted from, “Built environment changes and active transport to school among adolescents: BEATS natural experiment study protocol” (Mandic et al., 2020).

The levels of influence within socioecological models are not isolated but rather interact with one another (Larouche & Ghekiere, 2018). Thus, this approach also underscores the interconnectedness of various factors. For instance, the demographics of a location can shape the built environment for AT, while simultaneously, the built environment can shape the demographics of those engaging in AT. Previous quantitative research employing this framework

has revealed compelling evidence of the neighborhood-built environment's impact on a range of healthy movement behaviours among children, including AT, outdoor play, and independent mobility (Faulkner et al., 2015; Mitra et al., 2014; Mitra & Manaugh, 2020; Smith et al., 2017). Moreover, studies investigating sociodemographic differences in children's movement behaviours suggest a trend where males exhibit higher activity levels compared to their female counterparts (Mitra & Nash, 2017; Voulgaris et al., 2015).

Consequently, the socioecological model guided the development of research questions and qualitative protocol for this study. Additionally, it informed subsequent qualitative analyses and the integration of quantitative and qualitative findings, facilitating a comprehensive examination of interventions targeting the built and social environment's impact on children's AT and outdoor play.

3.2 Study Design

This study extends from of a larger mixed methods evaluation of the CoM program. During phase 1 and phase 2 of the CoM evaluation, changes in community-wide movement behaviours were assessed broadly. Employing a mixed methods explanatory sequential design (Creswell, 2013), this study utilizes quantitative methods and subsequent qualitative methods to address the following research questions:

- (1) What differences do we observe in children's AT and outdoor play from phase 1 to phase 2?
- (2) Are there differences in AT and outdoor play at phase 1 and phase 2 by gender, and does the proportion of girls and boys engaging in AT and outdoor play change between these periods?
- (3) What factors underlie the observed changes in AT and outdoor play between phase 1 and phase 2, and what are the perceptions and experiences of these changes from community leaders and children?

Firstly, the quantitative phase of study involves secondary analysis of observational counts collected during phase 1 and 2 of the CoM evaluation. These counts provide measures for children's engagement in AT and outdoor play in key settings across three CoM communities. The objective of this phase is to quantify the levels of AT and outdoor play among children at phase 1 and phase 2 in each community and to assess differences between these time points.

Subsequently, the qualitative phase of study includes document review of secondary data, CoM planning and reporting tools from the three study communities completed during phases 1 and 2 of the CoM evaluation. Additionally, primary qualitative data was collected through a focus group with CoM leadership team members and children from one community under study. Content analysis of the focus group transcript was performed. The aim of the second phase is to utilize textual data from CoM reports and the focus group to interpret and expand on numeric findings (see Appendix A for detailed outline of study phases, procedures, and products).

3.2.1 Rationale

Mixed methods approaches are widely used in health and social sciences research due to their ability to address complex questions and generate nuanced, comprehensive findings (Creswell, 2013; Draucker et al., 2020). For this study, a mixed methods approach is advantageous as it allows for assessing both the effectiveness of built and social environment interventions in changing children's movement and the underlying mechanisms driving these changes. Explanatory sequential designs, a subtype of mixed methods studies, are particularly useful for explaining, interpreting, or expanding upon quantitative results (Draucker et al., 2020).

Initially designed as a quantitative study, this research underwent a methodological shift based on recommendations from my thesis committee. Recognizing that quantitative data alone would not sufficiently capture the factors influencing variations in children's AT and outdoor

play, a mixed methods design was adopted. Furthermore, as this study extends from the larger CoM evaluation, employing a mixed methods approach promises more meaningful findings that can be returned to CoM communities and inform future movement initiatives.

While quantitative data will offer insights into 'what' changes occurred in children's engagement in AT and outdoor play due to community-wide environmental interventions, qualitative data will facilitate deeper exploration into 'how' and 'why' these interventions influenced children's engagement. Moreover, the application of an explanatory sequential design will be particularly beneficial in explaining any unexpected findings and providing a deeper understanding of the socioecological constructs influencing children's AT and outdoor play.

3.2.2 Relationship Between Quantitative and Qualitative Data

In a mixed-method explanatory sequential study, the quantitative phase of inquiry informs the subsequent qualitative phase's data collection and analysis. In this study, the quantitative phase shaped the qualitative phase by informing the development of the focus group protocol based on the findings from observational counts of children's engagement in AT and outdoor play. For instance, the quantitative analysis revealed overall positive changes in children's levels of walking/wheeling and cycling after built and social environment interventions in Antigonish County. However, these changes varied across count sites within the community. Consequently, prompts were incorporated into the focus group protocol to gather additional insights into why changes in children's AT differed at different sites and to explore the socioecological factors (e.g., perceived safety, infrastructure, etc.) that may have influenced these observed changes. Additionally, exploring community leaders' and children's perceptions and experiences of the changes helped to reinforce the findings from the quantitative phase.

Furthermore, the qualitative phase of the study not only complemented the initial phase but also shaped the integration of quantitative and qualitative results. For instance, document reviews of CoM planning and reporting tools completed during phases 1 and 2 of the evaluation in the three CoM communities provided valuable contextual data. These documents offered insights into the specific built and social environment interventions implemented within each community and their geographic distribution. By triangulating qualitative findings with the quantitative data, this study will provide a comprehensive understanding of the complex interplay between environmental interventions, community characteristics, and children's AT and outdoor play behaviours.

3.3 Researcher Positionality and Reflexivity

A crucial strategy for upholding the quality of research, particularly in the social sciences, is reflexivity (Berger, 2013; Fook, 1999; May, 1999). Reflexivity is the process of continually acknowledging, addressing, and reflecting on the researcher(s) identity and positionality within the research, to make explicit the ways in the researcher has shaped the production and understanding of knowledge (Wilson et al., 2022). As the researcher is deeply embedded in all research activities and the interpretation of study findings, it is essential that the researcher and readers can assess the potential impacts and implications of the researcher's involvement (Berger, 2013). A critical perspective on the importance of reflexivity is expressed by Fook (1999):

“Critical social science researchers need to be able to trace the effects of their own position on their research, if they are to avoid imposing their own perspectives on the people they are researching. If existing structures of domination are to be challenged, the

critical researcher needs to challenge unexamined assumptions inherent in [their] own thinking.” (p. 11)

To ensure the principles of reflexivity are maintained throughout the research process, I, as the researcher, continuously reflected on my own positionality using memoing and reflexive note taking during all research activities. Memoing is a common reflexive writing tool used in qualitative research methodologies, in which the researcher documents written reflections during research activities to contextualize and track any activities and/or findings that may have been impacted by the researcher’s knowledge or thinking (Olmos-Vega et al., 2022).

To be self-reflexive it is also important that I share my positionality within this study. Thus, I will acknowledge how my identity, experiences, and knowledge have shaped this research and my views regarding children’s engagement in AT and outdoor play within Nova Scotia and more broadly. I personally identify as a white, able-bodied, cis-gendered female. I was born and raised in Nova Scotia, Canada. Nova Scotia is located in Mi’kma’ki, the ancestral and unceded lands of the Mi’kmaq people. Also, I currently live, work, go to school, and play in the province’s capital city, Halifax (also referred to as K’jipuktuk in Mi’kmaw). As an adult living within an urban center, I use AT as my main form of travel. My current engagement in AT is highly influenced by my neighborhood-built environment. For example, my neighborhood is located close to services and amenities, features sidewalks, separated bike lanes, and public transportation routes. However, I personally fear using forms of AT such as cycling in areas without separation from vehicle traffic, due to my own perceived risk of injury. As a female, I am also hesitant engaging in AT alone, particularly at night. In my childhood I mainly engaged in AT for short trips when also accompanied by peers and/or an adult. I personally believe AT is inaccessible to the majority of Nova Scotians for commuting and other forms of travel,

especially those who live in rural, low-density areas, and/or those with physical disabilities. I also recognize that my lived experiences with AT may differ significantly from other adults and children living across Nova Scotia. Further, children's access and willingness to engage in AT may vary widely due to various contexts, such as social, environmental, and public policy factors.

In addition, my engagement in outdoor play in early childhood was heavily influenced by my caregivers' perceptions of safety and the surrounding natural and built environments. As a child I was as privileged to live in a neighborhood close to two schools, which provided ample access to parks, playgrounds, and outdoor fields. My neighborhood also had natural features such as a river and dense woodland, which allowed me to engage in various types of nature-based and unstructured play. In addition, my neighborhood had high social connectivity and there were many children of similar age in my proximity. However, I was only allowed to engage in outdoor play during daylight hours, when accompanied by a trusted adult, or with other children under the condition that I had received pre-approval from my caregivers' and stayed within walkie-talkie range for communication. The lack of independent outdoor play was largely influenced by my caregivers' perceptions of risk, especially due to my gender, as prior experiences and mainstream media perpetuated fear. However, with age, my independent mobility gradually increased. I acknowledge that my lived experience likely differs from the experiences of others within Nova Scotia, and the experiences of children today as media, technology, and play has transformed over the past two decades.

As well, I am a Master of Arts in Health Promotion student and work on various health-promoting research projects at Dalhousie University. Prior to this, I attained a Bachelor of Science Honours degree in Life Sciences with a minor in Psychology from Queen's University.

Since childhood I have pursued higher education to achieve a career in the field of health, with the goal of improving the health and well-being of those living in Nova Scotia. Throughout my experiences in higher education, I have become an advocate for increasing accessibility, inclusion, and participation in physical activity and AT in Nova Scotia, particularly for children based on a life-course approach to health. Furthermore, this study is part of the larger CoM evaluation. For the past two years, I have been actively involved in this evaluation as a research assistant/coordinator. In this role I have participated in the various evaluation activities, such as data collection, analysis, and reporting, as well as interviews and meetings with evaluation partners and CoM communities. My involvement in the CoM evaluation has further developed my views and understanding on children's engagement in AT and outdoor play across the province. Also, the development of this study's research questions, and methodology was chosen based on the ongoing CoM evaluation activities, feedback from evaluation partners and my thesis committee, as well as my own passion for increasing children's health and well-being through enhancing opportunities to AT and outdoor play in my home province.

3.4 Background: CoM Evaluation

The Municipal/Mi'kmaw Physical Activity Leadership (MPAL) program was launched in 2006 by the province of Nova Scotia's Department of Communities, Culture, Tourism, and Heritage (CCTH). The purpose of the MPAL program is to support the development and implementation of community-wide physical activity and movement plans. These plans are intended to enhance five outcomes: (1) social supports for walking, (2) social supports for other less structured movement, (3) physical environments for walking, (4) physical environments for other less structured movement, and (5) policies to support movement. As well, two priority populations were identified to guide the development of the community-wide plans: (1) those

who are less active and (2) those with less access and equity-denied groups. In 2018, through a request for proposals, the CCTH selected four MPAL communities to participate in a pilot program, CoM. Pilot communities are receiving support and funding over a three-year period (2022-2025) to help advance and evaluate their community-wide physical activity and movement plans. The timing and scale of CoM-related activities vary between each community. In addition, an existing provincial public awareness and engagement initiative, Make Your Move (MYM) is supporting the pilot communities and acting as the public face of the CoM program. MYM emphasizes “simple movement¹”, examples of this type of movement include walking, active play, and cycling. The CoM pilot communities include the County of Antigonish, the Town of Lockeport, the Municipality of the District of Yarmouth (including the Town of Yarmouth) and Wagmatcook First Nation. These communities were selected by the CCTH based on their proposals for community-wide action plans that encourage simple movement and advance the goals of Let’s Get Moving Nova Scotia, as well as their existing investments in infrastructure for AT and other simple movement. For this study, the community of Wagmatcook First Nation is not included in data collection or analysis procedures as phase 2 of the evaluation was not completed during the study’s duration; thus, differences in children’s movement behaviours could not be assessed in this community setting. Table 1 provides a brief overview of built and social environment interventions initiated in Antigonish, Lockeport, and Yarmouth, since the inception of the CoM program.

¹ “Simple Movement” includes low-barrier, less structured activities like active play with animals or kids, household chores, gardening, walking, short bike trips, as well as times you may break up your sitting time by standing or moving.

Table 1. Overview of CoM Interventions Initiated in Antigonish, Lockeport, and Yarmouth

<i>Community</i>	<i>Built Environment Interventions</i>	<i>Social Environment Interventions</i>
<i>Antigonish</i>	<ul style="list-style-type: none"> • Community AT Network Project • AT/Movement Signage • Bike racks • Outdoor Recreation Grants 	<ul style="list-style-type: none"> • Walk Leader Training • Community Movement Navigator • MYM Marketing Campaign • MYM Antigonish Community Celebration • Subsidized Outdoor Movement Opportunities • Access to Facilities Initiative
<i>Lockeport</i>	<ul style="list-style-type: none"> • Installation of AT Amenities • AT Pathway • Concrete Connectors • NS Walks Rural Sign Program • Community Playbox 	<ul style="list-style-type: none"> • MYM Marketing & Events • Multi-Generational Walking Event • Bike Initiatives • Movement Leadership Training • Community Inventory of Outdoor Spaces
<i>Yarmouth</i>	<ul style="list-style-type: none"> • Lake Milo AT Project • Sidewalk Additions • Bike Lane Additions • Community Splash Park • Community Playbox 	<ul style="list-style-type: none"> • Walk Leader Training • Community-Based Walks • Walk Challenges • Workplace Movement Challenge • Youth Peer Mentorship • Loaner Kits & Bike Loan Program • MYM Marketing & Events • Families at Play Program • Community Scavenger Hunts in Trails and Parks

To evaluate the progress and impact of CoM, a mixed methods program evaluation is being conducted by a team of researchers from Dalhousie University’s Healthy Population Institute and consultancy firm Research Power Incorporated, led by Dr. Sarah Moore, Dr. Sara Kirk, and Stephanie Heath. The evaluation utilizes a participatory approach that incorporates the knowledge and values of all partners involved (Garaway, 1995). A logic model was developed to

guide the evaluation, providing a high-level description of CoM, linking activities to outcomes, and identifying indicators for process and outcome measures (see Appendix B for CoM logic model). The methods include dissemination of a provincial-wide survey with oversampling in CoM communities, quantitative data collection of observational and accelerometry-based measures of community-wide movement behaviours in each CoM community, and qualitative analysis of community action plans, reports, and interviews with community leadership team members and other key informants. This multi-phase evaluation is occurring over a three-year period, from 2022 to 2025. This study draws on data collected during Phase 1 and Phase 2 of CoM, specifically observational data from the Fall of 2022 and Fall of 2023, as well as planning and reporting tools completed by community leaders during both phases.

3.5 Phase 1: Quantitative Approach

3.5.1 Observational Counts Sample

Quantitative data was collected in three Nova Scotian communities, the County of Antigonish, the Town of Lockeport, and the Municipality of the District of Yarmouth (see Table 2 for community characteristics and Appendix C for map of CoM communities). As mentioned above, these three communities were selected to participate in the CoM project by the CCTH based on their proposals for community-wide action plans that encourage simple movement and advance the goals of Let's Get Moving Nova Scotia, as well as their current investments in infrastructure enhancements for AT and other simple movement.

Table 2. Community Characteristics

	County of Antigonish	Town of Lockeport	Municipality of the District of Yarmouth
Area	1,456.42 km ²	2.32 km ²	2,121.64 km ²
Population	20,129	476	24,947
Percentage of Pop. Women	51.64%	55.79%	51.58%
Distribution of Population by broad age groups: 0 to 14 years	15%	8.4%	13.6%
Location	Northeastern Nova Scotia	Southeastern Nova Scotia	Southwestern Nova Scotia

Note. Data from, “Census profile: 2021 Census of Population” (Statistics Canada, 2022).

3.5.2 Quantitative Instruments

To observationally measure community-wide engagement in AT and outdoor play within communities, the CoM evaluation used two quantitative instruments: (1) a hard copy cycling and pedestrian count form (see Appendix D) and (2) a hard copy System for Observing Play and Recreation in Communities (SOPARC) observation form (see Appendix E).

The cycling and pedestrian count form was developed by the CoM evaluation team adapting methodology used in Velo Canada Bike’s national bike surveillance study, Pedal Poll. Pedal Poll is the first national cycling count in Canada, aiming to collect annual data on who is cycling and where to support policy and practice for equitable cycling (Winters et al., 2021). The initiative developed an application-based interface using Counterpoint, a transportation planning and measurement tool, to collect data on the number of people engaging in AT, their choice of mode, and their perceived age, gender, and race (*CounterPoint - Where Everyone Counts*, n.d.; Winters et al., 2021). Using cycling and pedestrian counts is useful to understand on how many people are engaging in AT on a given route, at what times and locations people are traveling, their choice of mode, and who is travelling (*Cyclist and Pedestrian Counts - Participatory Planning*, n.d.). It is also valuable for establishing trends in data collected over time.

Additionally, using methodology consistent with national surveillance studies strengthens the future application and generalizability of findings.

Developed in 2006 by a US-based research team, SOPARC has evolved into an essential tool used in systematic observation studies to obtain quantifiable data on recreational park user's behaviours and demographics, as well as contextual data on park settings (Marquet et al., 2019; McKenzie et al., 2006). SOPARC is particularly suitable for measuring children's engagement in outdoor play as it gathers data on park users' physical activity levels using codes from the System for Observing Play and Leisure Activity in Youth (SOPLAY); however, it improves upon SOPLAY by adapting the protocol to assess diverse community activity environments beyond school settings and by expanding perceived race and age group categories (McKenzie et al., 2006). SOPARC utilizes momentary and group time sampling techniques to observe park use throughout the day. This technique has been used in previous studies examining the impact of environmental interventions on children's activity levels during the school day (McKenzie et al., 2006).

SOPARC counter's measure physical activity levels of park users by performing scans of a target area (left-to-right scan of predetermined zone within the park space) and coding individual's activity as either sedentary, walking, or vigorous (McKenzie et al., 2006). These codes can then be used to estimate park user's metabolic equivalents of tasks (METs), a practical measure of energy expenditure during physical activity (Jetté et al., 1990; McKenzie et al., 2006). Counters conduct consecutive scans to also collect observations on the demographics of park users (perceived age, gender, and race) and the characteristics of the target area, including its accessibility, equipment availability, lighting, and usability (McKenzie et al., 2006).

There is a large body of evidence suggesting that SOPARC has high reliability in observing park users and physical activity levels (Marquet et al., 2019), and validity of SOPARC physical activity codes has been established through heart rate monitoring and pedometer studies with school-aged children (McKenzie et al., 2006). However, the reliability of SOPARC can lower if counters lack adequate training (Marquet et al., 2019). The use of SOPARC in this study is instrumental in understanding how many children are engaging in outdoor play at recreational parks in community settings, the activities they are engaging in, their physical activity levels, as well as the demographics of children visiting parks and engaging in outdoor play. Like the cycling and pedestrian counts, SOPARC can also be valuable for establishing trends in data collected over time.

3.5.3 Quantitative Data Collection

Cycling and pedestrian counts and SOPARC counts measured the number and demographic characteristics of people engaging in AT and outdoor play over the course of three days in each CoM community (two weekdays and one weekend day), as described above in phases 1 (Fall 2022) and 2 (Fall 2023) of the CoM evaluation. Trained volunteers and/or evaluation staff conducted counts at designated sites in each CoM community, selected in consultation with community leaders. A range of urban and rural areas, including areas where infrastructure would be installed as part of the broader CoM program were chosen to accurately reflect the dynamic changes in movement that may occur within each community. In larger communities like County of Antigonish and the Municipality of the District of Yarmouth, four cycling and pedestrian count sites and one park site were selected. In the smaller community of the Town of Lockeport, only three count sites and one park site were selected. Counters were instructed to record weather conditions during counting periods, quality of infrastructure, day of

the week, and perceived gender, age, and race of people observed, as these factors may influence physical activity participation. Gender categories included boys, girls, or indiscernible. Counters were instructed to select indiscernible if they were unable to determine an individual's gender due to clothing, body posture, or other factors that made identification unclear; therefore, this category does not represent gender-diverse or gender non-conforming individuals. This approach aimed to ensure that observations were as accurate as possible while acknowledging the limitations of visual identification in certain contexts.

Each cycling and pedestrian count period lasted 120-minutes and occurred four times throughout the day (07:00-9:00, 11:00-13:00, 15:00-17:00 and 17:00-19:00). SOPARC scans occurred in four 30-minute intervals during the same time periods as the cycling and pedestrian counts. For example, the morning 07:00-09:00 period involved four scans at 07:00, 07:30, 08:00, and 08:30. Counting over various periods of the day allowed for a more comprehensive representation of people that actively commute or participate in recreational walking, wheeling, cycling, or other forms of physical activity, as opposed to relying on data from only one counting period.

3.5.4 Quantitative Data Analysis

Secondary quantitative data analysis investigated the number and characteristics of children engaging in AT and outdoor play within three CoM communities during phases 1 and 2 of the CoM evaluation. Descriptive statistics were conducted to provide an overview of the data. This included calculating the total and proportion of children, by gender, engaged in AT and outdoor play during each phase at each count site and overall, in each community. To calculate boys', girls', and children's physical activity levels during play, SOPARC activity levels (sedentary, walking, and vigorous) were summed across all observation periods for each park

area. This provided a total activity count for each activity level (for boys, girls, and all children) over all observation days and time periods at each park site and park sub-area. Additionally, frequency distributions were examined to understand the distribution of children's demographic characteristics, weekday versus weekend engagement, and physical activity levels of outdoor play within each count site and community during phases 1 and 2. Prior to analysis data cleaning procedures were employed to identify and address missing or inaccurate data points within the collected datasets. This process also aimed to maintain consistency in data formatting across all variables to ensure the subsequent analysis was accurate and reliable.

This analysis aimed to identify differences in children's engagement in AT and outdoor play between two phases, while also exploring any gendered differences. Three hypotheses were formulated: (1) children's levels of AT and outdoor play will increase from phase 1 to phase 2, and children will engage in more active outdoor play at phase 2, (2) at phase 1, girls will have lower engagement in AT and outdoor play and less active outdoor play, in comparison to boys and at phase 2, girls' and boys' engagement in AT and outdoor play and activity level during outdoor play will be more comparable, and (3) there will be a larger proportion change between phase 1 and phase 2 in respect to girl's levels of AT and outdoor play and activity level during outdoor play, in comparison to the proportion change shown in boys between phase 1 and phase 2. By addressing these hypotheses, this study aims to provide insights into the dynamics of children's engagement in healthy movement behaviours before and after built and social environment interventions.

3.6 Phase 2: Qualitative Approach

3.6.1 Focus Group Sample

The focus group comprised of 11 members of the County of Antigonish's CoM leadership team actively engaged in planning and implementing built and social environment interventions during phases 1 and 2 of the CoM project. Additionally, 5 children between the ages of 13 to 18 years old, residing in Antigonish County for at least one year prior to data collection, participated in the focus group. Participants represented both rural and urban areas across the county. All participants demonstrated sufficient fluency in English to engage effectively in the focus group discussions without requiring translation assistance.

The sample size was determined to ensure representation of diverse child experiences within the participating community. A lower age limit of 13 was chosen, as individuals around this age typically exhibit greater mobility independence compared to younger counterparts (Larouche et al., 2023; Marzi & Reimers, 2018). Regarding the upper age limit, 18 was selected, aligning with the legal age of majority in Nova Scotia, which is 19. Therefore, individuals under the age of 19 are considered minors, justifying the inclusion of participants up to this age.

Recruitment utilized purposive sampling, supplemented by snowball sampling techniques. A recruitment poster (see Appendix F) and information sheet (see Appendix G) were distributed to Antigonish County's MPAL and subsequently through community networks via email communication.

3.6.2 Qualitative Instruments

To explore contextual factors influencing changes in children's engagement in AT and outdoor play within the study communities, as well as community leaders' and children's perceptions of these changes, two qualitative instruments were employed. Firstly, the CoM

planning and reporting tool, completed as part of phases 1 and 2 of the CoM evaluation, supports CoM community leadership teams and the MPAL in implementing and evaluating project activities (see Appendix H for CoM planning and reporting tool template). This tool, developed by the CCTH and evaluation team, is submitted bi-annually by community MPALs. It assesses various aspects of CoM initiatives, including social supports and physical environments for walking and simple movement and supportive policies for movement.

Secondly, a focus group was conducted with CoM leadership team members and children from one study community, the County of Antigonish. The protocol and interview guide for the focus group, found in Appendix I, were developed by the researcher conducting this study. These instruments were informed by the study's theoretical framework and quantitative findings of children's engagement in AT and outdoor play between CoM phases 1 and 2 in Antigonish County.

3.6.3 Qualitative Data Collection

CoM planning and reporting tools were completed by the study community's MPALs for phase 1 (encompassing the reporting period from April 1, 2022 to March 31, 2023) and phase 2 (encompassing the reporting period from April 1, 2023 to September 30, 2023).

The focus group was conducted by the primary researcher and took place in-person at a private location in Antigonish County, chosen by the participants. The session lasted approximately one hour and was recorded using a Dalhousie University audio recording device. Prior to commencing the audio recording, participants provided informed consent and completed a demographic questionnaire (refer to Appendix J for consent forms and Appendix K for the demographic questionnaire). Following data collection, the focus group audio recording was

transcribed verbatim using Microsoft Word. The transcription and participant's demographic questionnaires were de-identified prior to analysis.

3.6.4 Qualitative Data Analysis

Qualitative data analysis explored the socioecological factors underlying observed changes in children's AT and outdoor play between phases 1 and 2 of the CoM evaluation and community leaders and children's perceptions and experiences of these changes. This analysis was comprised of two components: document review and content analysis.

The document review involved examining CoM planning and reporting tools from the three communities under study, completed during phases 1 and 2 of the broader evaluation. These documents provided valuable insights on the interventions implemented and the progress made over the evaluation period. Serving as rich sources of contextual information, they clarified the local physical, social, and policy environments within each community. The aim of the document review was to gain a comprehensive understanding of the interventions employed and their geographical distribution across the communities to assist with the integration of quantitative and qualitative findings.

Content analysis involved examining the focus group transcript and demographic questionnaires obtained during primary data collection. This method enables researchers to gain a deep understanding of a particular phenomenon by identifying structures (i.e., key themes, patterns, similarities, and differences, etc.) among large amounts of textual data (Kleinheksel et al., 2020). Eight stages of qualitative content analysis were followed, based on those described by Zhang and Wildemuth (2009): prepare the data; define the unit of analysis; develop categories and coding scheme; test coding scheme on a text sample; code all the text; assess consistency of coding; draw conclusions from coded data; and report the methods and findings.

Conducted using NVivo (version 13), a qualitative data analysis software program, this analysis used a deductive approach guided by the research questions and informed by socioecological model described above. Deductive content analysis is recommended when there are existing theories or research findings that can be used as guidance for initial coding, in comparison to inductive analysis, which is used when there is little knowledge on the topic(s) of study (Hsieh & Shannon, 2005). Therefore, a deductive approach was most appropriate for this explanatory sequential study.

The unit of analysis in content analysis can vary depending on the research questions and the nature of the data (Elo & Kyngäs, 2008). For example, units can include words, phrases, sentences, themes, or entire paragraphs (Elo & Kyngäs, 2008). The unit of analysis selected for this study was theme, chosen to capture the contextual richness and complexity of participants' responses. Themes were identified by examining sentences and phrases within the textual data that appeared to capture something meaningful in relation to the research questions (Vaismoradi et al., 2013).

In this study, content analysis provided further contextual information regarding the local physical, social, and policy environments in one CoM community, the County of Antigonish. This exploration identified factors that may have influenced changes in children's engagement in AT and outdoor play between phases 1 and 2 within Antigonish. Additionally, it focused on understanding community leaders' and children's experiences and perceptions of these changes. Content analysis aimed to enhance the researcher's understanding of the socioecological constructs influencing children's AT and outdoor play and assist in the interpretation of numeric findings from the initial phase of study.

3.6.5 Quality and Rigour

This study implemented several strategies to uphold the quality and rigour of qualitative work, ensuring the validity and reliability of both the procedures and findings (Creswell & Creswell, 2019). Validity, referring to the accuracy of findings, and reliability, referring to the consistency of the approach, were strengthened through the assessment of credibility, dependability, confirmability, and transferability (Stenfors et al., 2020). By addressing these quality considerations, this study aimed to produce findings that contribute meaningfully to the literature on children's AT and outdoor play.

To assess credibility the study employed triangulation, using multiple data sources including CoM planning documents, focus group transcripts, and demographic questionnaires (Creswell & Creswell, 2018). Additionally, the researcher's positionality and prolonged time spent in the data strengthened the analysis, providing an in-depth understanding of the communities under study and the interventions taking place that may have influenced children's AT and outdoor play. Dependability was addressed by maintaining a systematic approach to data collection and analysis. The use of NVivo software and a codebook facilitated consistent coding and management of data. The researcher documented decisions made throughout the analysis, describing the data, identified themes, and contextual factors that may have influenced this process. Transcripts and codes were checked multiple times to ensure consistency of findings. Confirmability was achieved through reflexivity and peer debriefing. The researcher used reflexive memoing to acknowledge potential biases and maintain objectivity. Peer debriefing sessions provided opportunities for discussion with colleagues, allowing for critical review of findings to ensure they were grounded in the data. To support transferability, the study provided a detailed description of the research context, participants, and settings. This "thick description"

supports readers understanding and enables other researchers to assess the generalizability of the findings (Creswell & Creswell, 2019).

3.7 Ethical Considerations

The larger CoM evaluation was exempt from REB review, as outlined in TCPS article 2.5 (*Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans*, 2022).

Nonetheless, the CoM evaluation team adhered to all recommended ethical guidelines. For the present study, the CoM community leadership teams and the CCTH reviewed and approved the study's purpose, design, and methodology. Additionally, permission to access secondary data was granted by the CCTH and CoM evaluation team. Ethics approval for primary data collection was obtained from the Dalhousie University REB, as indicated in the REB letter of approval (project #2023-6974) available in Appendix L of this document.

Any identifiable information collected as part of this study was uploaded to a secure OneDrive folder on a password-protected computer at Dalhousie University, accessible only to the lead researcher and research supervisor. Physical copies of data were stored in a private and locked location within Dalhousie University. The physical recording device used for the focus group was kept by the researcher in a private and locked location at Dalhousie University until the audio recording files could be transferred to the secure OneDrive and subsequently deleted from the physical device. Prior to analysis, identifying information (e.g., names of individuals, locations, etc.) was replaced with pseudonyms or contextual descriptions as appropriate.

Findings from this study will be disseminated to all CoM community leadership teams and the CCTH through the CoM evaluation's formal reports and various other knowledge translation activities (e.g., presentations, infographics, etc.). These knowledge translation activities will be developed in consultation with the relevant end-users. Additionally, the student

conducting this research is actively involved in the execution of the original evaluation and has received scholarship funding from BRIC NS for this present study, but has no conflicts of interest to disclose.

3.8 Limitations

The evaluation team conducting the CoM evaluation had little control over the timing of infrastructure changes within each community. Prior to this study's commencement, members of each community's CoM leadership team had already submitted an overview of the interventions and infrastructure changes that were to be implemented as part of the CoM project to the CCTH; however, the scale and timing of these changes varied across the communities involved. Also, delays in construction due to unforeseen circumstances impacted the timing of some proposed interventions. Little control over the timing of interventions and infrastructure changes may have limited the ability of quantitative data collection to accurately represent the impact of built and social environment interventions on children's movement. Additionally, quantitative data collection methods from the CoM evaluation relied on counter's perceptions of gender, age, and race. These categories are influenced by the subjectivity of counters, and as a result this may have impacted the validity and reliability of demographic data gathered. In an ideal scenario, gender would have been self-reported and included options for non-binary, trans, two-spirited, and other gender identities; similarly, age and race would be more reflective of each community's population if self-reported. However, this would require intercept survey methods, which require extensive resources and are expensive to conduct given the scale of the evaluation and the present study.

3.9 Summary

This study extends from a larger evaluation of the CoM program, which explores the influence of community-wide environmental and policy interventions in selected communities across Nova Scotia to advance a culture of daily movement. Utilizing a mixed methods explanatory sequential design, the study begins with quantitative methods followed by qualitative methods, with a socioecological model serving as the theoretical framework. The quantitative phase of study includes observational counts of children's engagement in AT and outdoor park use, collected in three CoM communities at two timepoints (T1: baseline; T2: one-year follow-up). Descriptive analysis was performed at both time points to assess outcomes, aggregating measures for all children and gender-specific subtotals. The qualitative phase of study includes document review of CoM planning and reporting tools completed by the three community's MPAL as well as a focus group with community leaders and children from one CoM community. Document review of completed reporting tools and content analysis of focus group interview transcripts and participant demographic questionnaires was performed to contextualize and expand on numeric findings.

CHAPTER 4: RESULTS

This chapter presents the findings derived from analysis of secondary and primary data. Following a mixed methods explanatory sequential design, quantitative and qualitative methodologies were employed to investigate the research questions: (1) What differences do we observe in children's AT and outdoor play from phase 1 to phase 2? (2) Are there differences in AT and outdoor play at phase 1 and phase 2 by gender, and does the proportion of girls and boys engaging in AT and outdoor play change between these periods? (3) What factors underlie the observed changes in AT and outdoor play between phase 1 and phase 2, and what are the perceptions and experiences of these changes from community leaders and children?

4.1 Phase 1: Quantitative Findings

Descriptive statistics were utilized to provide a comprehensive insight into the quantitative data. This included cycling and pedestrian counts as well as SOPARC counts collected in three communities and at two timepoints of the CoM evaluation: (T1) phase 1, Fall 2022, and (T2) phase 2, Fall 2023. This analysis explored the following three hypotheses:

- (1) Children's levels of AT and outdoor play will increase from phase 1 to phase 2, and children will engage in more active outdoor play at phase 2.
- (2) At phase 1, girls will have lower engagement in AT and outdoor play and less active outdoor play, in comparison to boys and at phase 2, girls' and boys' engagement in AT and outdoor play and activity level during outdoor play will be more comparable.
- (3) There will be a larger proportion change between phase 1 and phase 2 in respect to girl's levels of AT and outdoor play and activity level during outdoor play, in comparison to the proportion change shown in boys between phase 1 and phase 2.

4.1.1 Antigonish

In Antigonish, four cycling and pedestrian sites were observed: STFX Sign (SS), Bay Street and Mount Cameron Circle (MC), Antigonish Landing Trail at Adams Street (AT), and the Beach Hill Roundabout (BR). In addition, one park site was observed at Columbus Field, which was broken down into two sub-areas: a) field and playground and b) tennis courts.

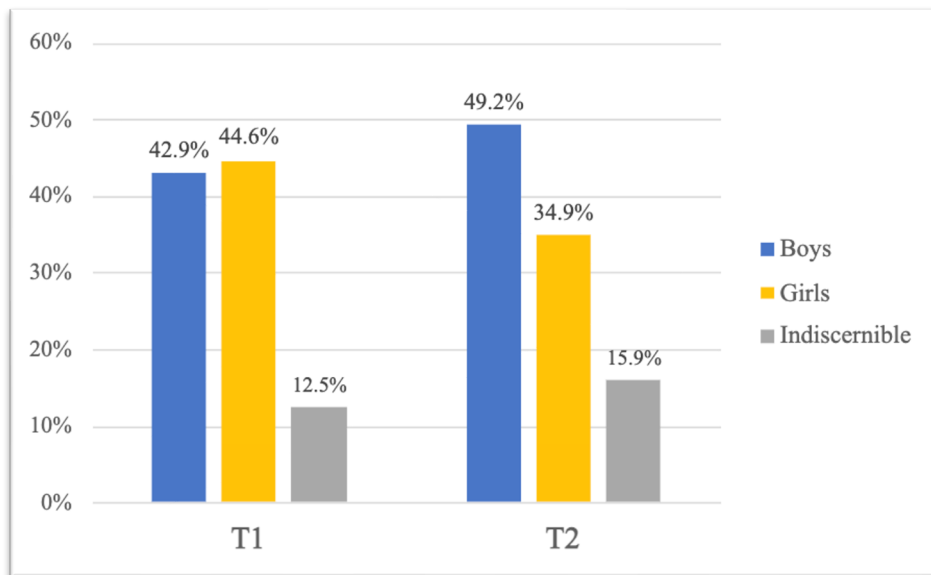
The number and proportion of children observed engaging in AT over all three collection days at T1 and T2 across sites in Antigonish is illustrated in Table 3. At T1, a total of 56 children were observed, with approximately 42.9% of children perceived to be boys, 44.6% girls, and 12.5% whose gender was indiscernible. At T2, the total children observed increased to 63, with boys making up 49.2%, girls 34.9%, and 15.9% had a gender that was indiscernible during observation. The percentage of children engaging in AT by perceived gender at T1 and T2 is highlighted in Figure 3. At T1, the AT count site had the highest observations with a slight decrease from 26 children at T1 to 23 at T2. The SS site saw an increase from 22 to 31 children from T1 to T2. Children had a minimal presence at the BR site with 3 children at T1 and none at T2, while MC increased from 5 children at T1 to 9 at T2.

Table 3. Total Children Observed at T1 and T2 by Perceived Gender on All Days at Each Pedestrian/Cycling Site in Antigonish

Antigonish Sites	T1				T2			
	Total	Boys	Girls	Indiscernible	Total	Boys	Girls	Indiscernible
AT	26 (46.4%)	14 (53.8%)	8 (30.8%)	4 (15.4%)	23 (36.5%)	8 (34.8%)	7 (30.4%)	8 (34.8%)
BR	3 (5.4%)	2 (66.7%)	1 (33.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
MC	5 (8.9%)	0 (0.0%)	5 (100%)	0 (0.0%)	9 (14.3%)	4 (44.4%)	5 (55.6%)	0 (0.0%)
SS	22 (39.3%)	8 (36.4%)	11 (50%)	3 (13.6%)	31 (49.2%)	19 (61.3%)	10 (32.3%)	2 (6.4%)
Total	56	24 (42.9%)	25 (44.6%)	7 (12.5%)	63	31 (49.2%)	22 (34.9%)	10 (15.9%)

Note. “Indiscernible” denotes children whose gender count not be identified during observation due to clothing, body posture, or other factors that made identification unclear. This category does not represent gender-diverse or gender non-conforming individuals.

Figure 3. Percentage of Children Observed Engaging in AT by Perceived Gender at T1 and T2 in Antigonish



When considering mode choice, at T1, 89.3% of the children were pedestrians and 10.7% were cyclists, which changed to 82.5% pedestrians and 17.5% cyclists at T2 (Table 4). At T1, a

higher proportion of boys were observed cycling (83.3%) compared to girls (16.7%). However, at T2, cycling was more comparable between boys (54.5%) and girls (45.5%).

Table 4. *Children's AT Mode Choice at T1 and T2 by Perceived Gender Across All Days and Count Sites in Antigonish*

<i>Mode</i>	<i>T1</i>				<i>T2</i>			
	<i>Total</i>	<i>Boys</i>	<i>Girls</i>	<i>Indis.</i>	<i>Total</i>	<i>Boys</i>	<i>Girls</i>	<i>Indis.</i>
Pedestrian	50 (89.3%)	19 (38%)	24 (48%)	7 (14%)	52 (82.5%)	25 (48.1%)	17 (32.7%)	10 (19.2%)
Cycling	6 (10.7%)	5 (83.3%)	1 (16.7%)	0 (0.0%)	11 (17.5%)	6 (54.5%)	5 (45.5%)	0 (0.0%)
Total	56	24	25	7	63	31	22	10

Note. Pedestrian mode choice included walkers, wheelchair users, passengers (e.g., child in a carrier or traveler on the back of a bike or wagon), and those using manual scooters and roller blades. "Indis." denotes children whose gender count not be identified during observation due to clothing, body posture, or other factors that made identification unclear. This category does not represent gender-diverse or gender non-conforming individuals.

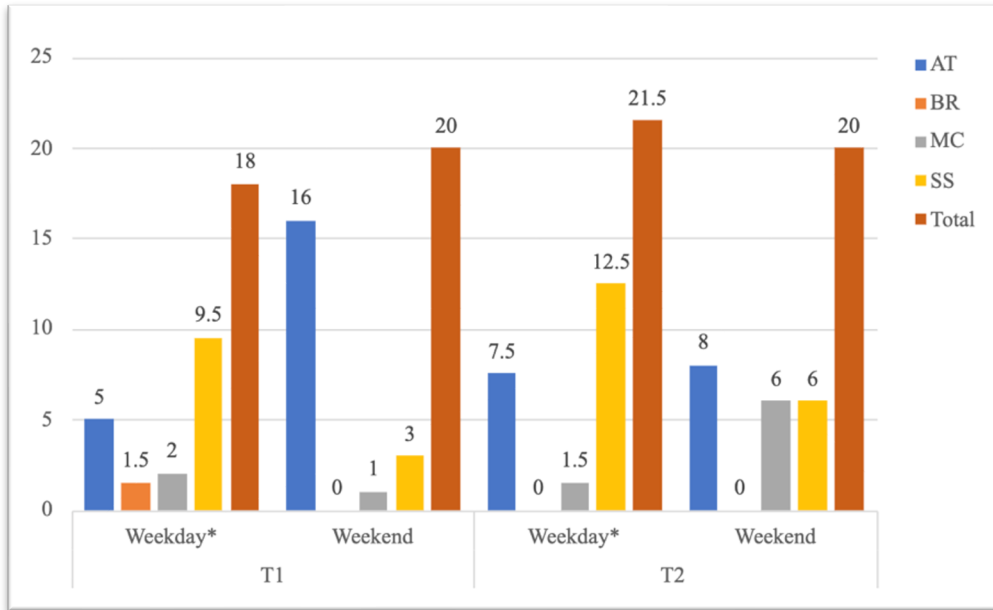
Analysis of weekday versus weekend observations showed a slight increase in weekday observations from a mean of 18 children at T1 to 21.5 at T2, while weekend observations remained constant at 20 children (as shown in Table 5 and Figure 4).

Table 5. *Total Children Observed at T1 and T2 by Site for Weekday Versus Weekend Pedestrian/Cycling Counts in Antigonish*

<i>Antigonish Sites</i>	<i>T1</i>		<i>T2</i>	
	<i>Weekday*</i>	<i>Weekend</i>	<i>Weekday*</i>	<i>Weekend</i>
AT	5	16	7.5	8
BR	1.5	0	0	0
MC	2	1	1.5	6
SS	9.5	3	12.5	6
Total	18	20	21.5	20

Note. *Mean of the two weekday observation days.

Figure 4. Total Children Observed at T1 and T2 by Site for Weekdays Versus Weekend Pedestrian/Cycling Counts in Antigonish



Note. *Mean of the two weekday observation days

It is important to also note factors that may have impacted the results collected at T1 and T2. At T1, the weather was warmer compared to T2, with T1 having a temperature high of 22 °C and low of 5 °C, while T2 has a high of 16 °C and low of 3 °C. Additionally, it rained heavily during the weekend observation periods in T2, whereas T1 had no rain. Other factors that may have impacted children’s engagement in AT include construction. During the T2 observations there was construction occurring at the SS count site, but the roadways and multi-use paths were still operational. Furthermore, there was construction and a road closure less than 1 km away from the BR count site at T2. At T1, no construction occurred at or near any count site.

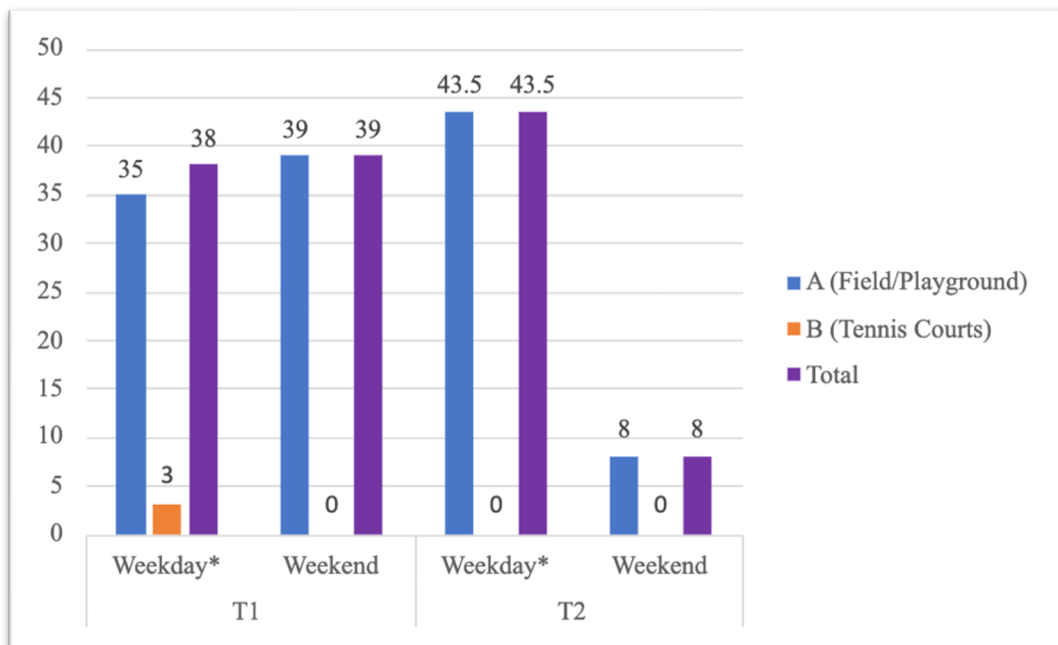
During the SOPARC observations at Antigonish’s Columbus Field, the total number of child park users decreased from 115 at T1 to 95 at T2 (shown in Table 6). In the field/playground area, the number of boys increased from 50 (45.9%) at T1 to 60 (63.2%) at T2, while the number of girls decreased from 59 (54.1%) at T1 to 35 (36.8%) at T2. No children were observed in the tennis court area at T2, compared to 6 girls (100%) at T1.

Table 6. Total Child Park Users at T1 and T2 by Perceived Gender Across Park Sub-Areas for SOPARC Observations in Antigonish

Columbus Field	T1			T2		
	Total	Boys	Girls	Total	Boys	Girls
A (Field/Playground)	109 (94.8%)	50 (45.9%)	59 (54.1%)	95 (100%)	60 (63.2%)	35 (36.8%)
B (Tennis Courts)	6 (5.2%)	0 (0.0%)	6 (100%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Total	115	50 (43.5%)	65 (56.5%)	95	60 (63.2%)	35 (36.8%)

Analysis of weekday versus weekend SOPARC observations revealed an increase in weekday observations at the field/playground area, rising from a mean of 35 children at T1 to 43.5 at T2. However, weekend observations at this park sub-area decreased significantly from 39 children at T1 to 8 children at T2 (as shown in Figure 5). The tennis court area saw a decrease in weekday observations, with an average of 3 children observed at T1 and none at T2. No children were observed at the tennis courts on the weekend collection day during both T1 and T2.

Figure 5. Total Child Park Users at T1 and T2 by Park Sub-Area for Weekday Versus Weekend SOPARC Observations in Antigonish



Note. *Mean of the two weekday observation days

Table 7 displays the number and percentage of child park users at T1 and T2, by perceived gender, engaging in different activity levels (sedentary, walking, vigorous) during outdoor play at Columbus Field. In the field/playground area, the proportion of children observed engaging in walking activities increased from 51.4% at T1 to 56.84% at T2, while the percentage of those sedentary decreased from 29.3% at T1 to 26.32% at T2. Vigorous activity in this area slightly decreased from 19.3% at T1 to 16.84% at T2. No physical activity was observed at the tennis court area at T2, whereas at T1, all 6 children observed were engaged in vigorous activity.

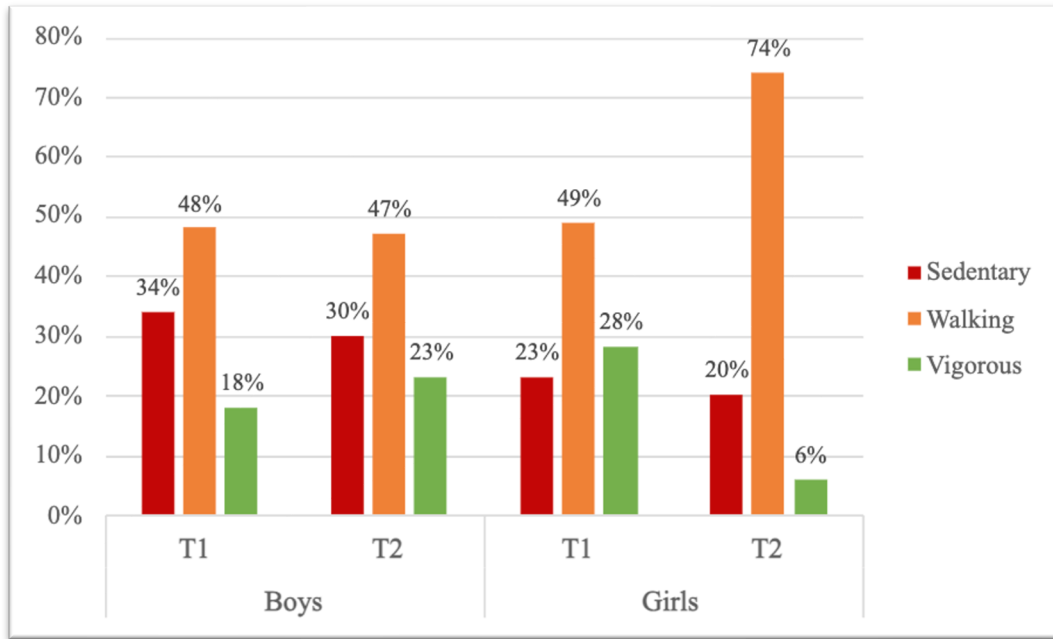
Table 7. *Physical Activity Levels of Child Park Users at T1 and T2 by Park Sub-Area Across All SOPARC Observations in Antigonish*

<i>Columbus Field</i>	<i>T1</i>				<i>T2</i>			
	<i>Total</i>	<i>Sedentary</i>	<i>Walking</i>	<i>Vigorous</i>	<i>Total</i>	<i>Sedentary</i>	<i>Walking</i>	<i>Vigorous</i>
A (Field & Playground)	109	32 (29.3%)	56 (51.4%)	21 (19.3%)	95	25 (26.32%)	54 (56.84%)	16 (16.84%)
B (Tennis Courts)	6	0 (0.0%)	0 (0.0%)	6 (100%)	0	0 (0.0%)	0 (0.0%)	0 (0.0%)
Total	115	32 (27.8%)	56 (48.7%)	27 (23.5%)	95	25 (26.32%)	54 (56.84%)	16 (16.84%)

Figure 6 illustrates the percentage of child park users, categorized by perceived gender, participating in outdoor play at sedentary, walking, or vigorous activity-levels during SOPARC observations in Antigonish. During T1, 34% of boys observed at Columbus Field were sedentary, 48% were engaged in walking activities, and 18% were involved in vigorous physical activities during outdoor play. Among girls, 23% were sedentary, 49.3% were walking, and 27.7% were engaging in vigorous physical activity. At T2 there were notable changes in children’s activity levels by gender. The percentage of boys’ sedentary activity decreased to 30%, while walking activities also decreased to 46.7%, and those involved in vigorous physical activity increased to 23.3%. For girls, the percentage observed being sedentary dropped to 20%,

at T2 with an increase in walking activities to 74.3%, while the percentage of outdoor play observed at vigorous physical activity-levels decreased to 5.7%.

Figure 6. *Percentage of Child Park Users by Perceived Gender Engaging in Sedentary, Walking, or Vigorous Activity Across All T1 and T2 SOPARC Observations in Antigonish*



4.1.2 Lockeport

In Lockeport, three cycling and pedestrian sites were observed: Beach Street and Hall Street (BH), Trestle Trail and Point Street (TT), and Hall Street and South Street (HS). In addition, one park site was observed at Seacaps Park. This park site was broken down into two sub-areas: a) field and b) playground.

The number and proportion of children observed engaging in AT over all three collection days at two timepoints (T1 and T2) across sites in Lockeport is illustrated in Table 8. At T1, a total of 512 children were observed, with approximately 46.5% perceived to be boys, 52.1% girls, and 1.4% whose gender was indiscernible. At T2, the total number of children observed decreased to 354, with boys comprising 55.7%, girls 43.5%, and indiscernible 0.8%. The

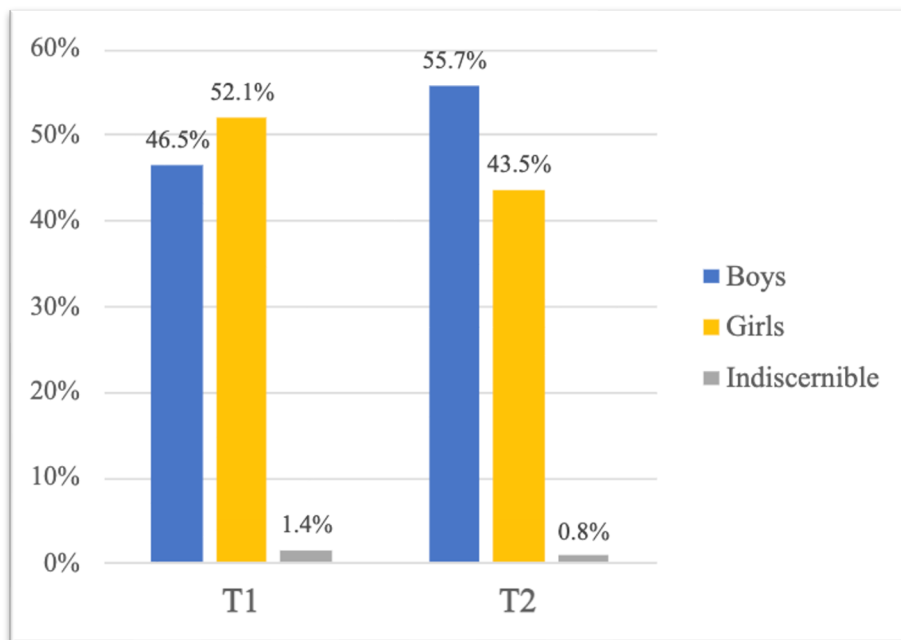
percentage of children engaging in AT by perceived gender at T1 and T2 is highlighted in Figure 7. At T1, the BH site had the highest observations with a decrease from 491 children at T1 to 341 at T2. The TT site saw an increase from 5 to 9 children from T1 to T2. At the BR site 16 children were observed at T1, while only 4 children were seen at T2.

Table 8. Total Children Observed at T1 and T2 by Perceived Gender on All Days at Each Cycling/Pedestrian Count Site in Lockeport

Lockeport Sites	T1				T2			
	Total	Boys	Girls	Indiscernible	Total	Boys	Girls	Indiscernible
BH	491 (95.9%)	224 (45.6%)	260 (53%)	7 (1.4%)	341 (96.3%)	188 (55.1%)	151 (44.3%)	2 (0.6%)
HS	16 (3.1%)	11 (68.75%)	5 (31.25%)	0 (0.0%)	4 (1.1%)	2 (50%)	1 (25%)	1 (25%)
TT	5 (1.0%)	3 (60%)	2 (40%)	0 (0.0%)	9 (2.5%)	7 (77.8%)	2 (22.2%)	0 (0.0%)
Total	512	238 (46.5%)	267 (52.1%)	7 (1.4%)	354	197 (55.7%)	154 (43.5%)	3 (0.8%)

Note. “Indiscernible” denotes children whose gender count not be identified during observation due to clothing, body posture, or other factors that made identification unclear. This category does not represent gender-diverse or gender non-conforming individuals.

Figure 7. Percentage of Children Observed Engaging in AT by Perceived Gender at T1 and T2 in Lockeport



When examining mode choice, at T1, most children engaged in pedestrian activity, encompassing 96.9% of observations, while 3.1% engaged in cycling. At T2, pedestrian activity decreased slightly to 92.4% and cycling increased to 7.6% (Table 9). At T1, an equal proportion of boys (50%) and girls (50%) were observed cycling. However, at T2, cycling was more prevalent among girls (55.6%) in comparison boys (44.4%).

Table 9. Children’s AT Mode Choice at T1 and T2 by Perceived Gender Across All Days and Count Sites in Lockeport

Mode	T1				T2			
	Total	Boys	Girls	Indis.	Total	Boys	Girls	Indis.
Pedestrian	496 (96.9%)	230 (46.4%)	259 (52.2%)	7 (1.4%)	327 (92.4%)	185 (56.6%)	139 (42.5%)	3 (0.9%)
Cycling	16 (3.1%)	8 (50%)	8 (50%)	0 (0.0%)	27 (7.6%)	12 (44.4%)	15 (55.6%)	0 (0.0%)
Total	512	238	267	7	354	197	154	3

Note. Pedestrian mode choice included walkers, wheelchair users, passengers (child in a carrier or traveler on the back of a bike or wagon), and those using manual scooters and roller blades. “Indis.” denotes children whose gender count not be identified during observation due to clothing, body posture, or other factors that made identification unclear. This category does not represent gender-diverse or gender non-conforming individuals.

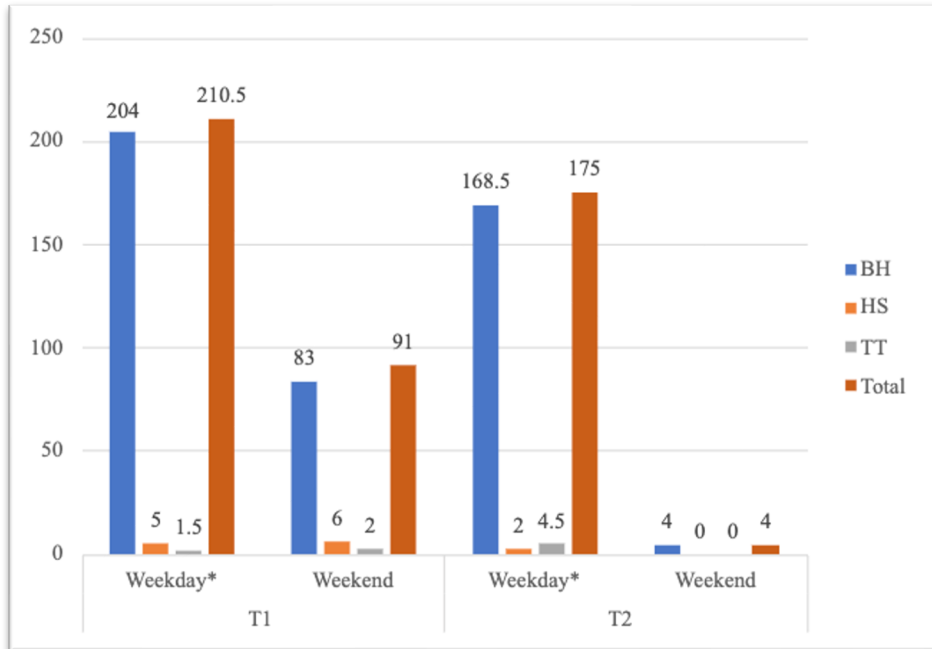
Analysis of weekday versus weekend observations showed a decrease in weekday observations from a mean of 210.5 children at T1 to 175 at T2. Similarly, weekend observations also decreased, from 91 children at T1, to only 4 children at T2 (illustrated in Table 10 and Figure 8).

Table 10. Total Children Observed at T1 and T2 by Site for Weekday Versus Weekend Pedestrian/Cycling Counts in Lockeport

Lockeport Sites	T1		T2	
	Weekday*	Weekend	Weekday*	Weekend
BH	204	83	168.5	4
HS	5	6	2	0
TT	1.5	2	4.5	0
Total	210.5	91	175	4

Note. *Mean of the two weekday observation days

Figure 8. Total Children Observed at T1 and T2 by Site for Weekday Versus Weekend Pedestrian/Cycling Counts in Lockeport



Note. *Mean of the two weekday observation days

It is important to consider various factors that may have influenced the results collected at T1 and T2. Firstly, weather conditions differed between the two timepoints, with T1 experiencing slightly warmer temperatures, ranging from a high of 19 °C to a low of 13 °C, while T2 had a high of 18 °C and low of 7 °C. Additionally, heavy rain occurred during the observation periods on the weekend collection day of T2, whereas T1 had no rain. Furthermore, community programming may have impacted children’s engagement in AT. For instance, during the T1 weekend collection day, a community event took place at the BH count site and park site, coinciding with midday observation periods. In contrast, no community events occurred during T2 observations.

During the SOPARC observations at Lockeport’s Seacaps Park, the total number of child park users decreased from 148 at T1 to 33 at T2 (shown in Table 11). In the field area, the number of boys decreased from 30 (33.0%) at T1 to 9 (64.3%) at T2, while the number of girls

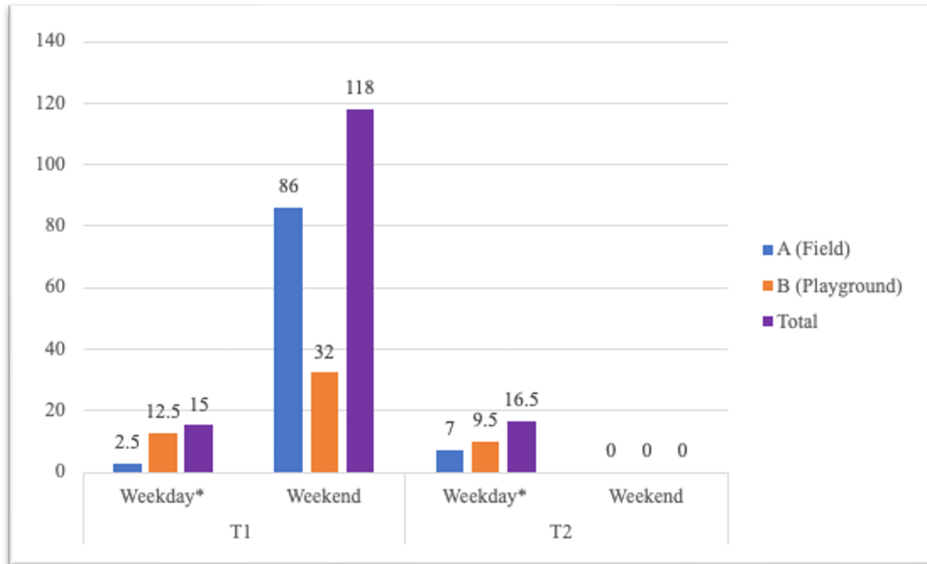
decreased from 61 (67.0%) at T1 to 5 (35.7%) at T2. At the playground area, the number of boys decreased from 18 (31.6%) to 10 (52.6%). Similarly, the number of girls observed at the playground decreased from 39 (68.4%) at T1 to 9 (47.4%) at T2.

Table 11. *Total Child Park Users at T1 and T2 by Perceived Gender Across Park Sub-Areas for SOPARC Observations in Lockeport*

<i>Seacaps Park</i>	<i>T1</i>			<i>T2</i>		
	<i>Total</i>	<i>Boys</i>	<i>Girls</i>	<i>Total</i>	<i>Boys</i>	<i>Girls</i>
A (Field)	91 (61.5%)	30 (33%)	61 (67%)	14 (42.4%)	9 (64.3%)	5 (35.7%)
B (Playground)	57 (38.5%)	18 (31.6%)	39 (68.4%)	19 (57.6%)	10 (52.6%)	9 (47.4%)
Total	148	48 (32.4%)	100 (67.6%)	33	19 (57.6%)	14 (42.4%)

Analysis of weekday versus weekend SOPARC observations revealed a rise in weekday observations at the field area, increasing from a mean of 2.5 children at T1 to 7 at T2. On the other hand, weekend observations at this park sub-area decreased significantly from 86 children at T1 to none at T2, as shown in Figure 9. At the playground area, weekday observations declined, with an average of 12.5 children observed at T1 and 9.5 at T2. Mirroring the trend at the field, weekend observations also decreased at the playground, with 32 children observed on the T1 weekend collection day, whereas no children were observed at T2.

Figure 9. Total Child Park Users at T1 and T2 by Park Sub-Area for Weekday Versus Weekend SOPARC Observations in Lockeport



Note. *Mean of the two weekday observation days

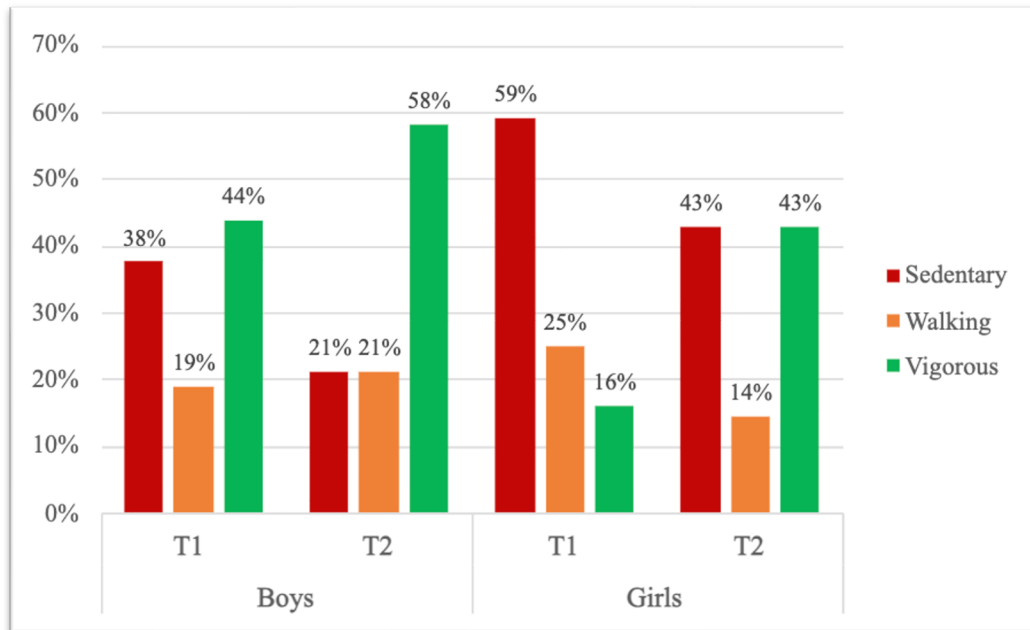
Table 12 displays the number and percentage of child park users, by perceived gender, engaging in different activity levels (sedentary, walking, vigorous) during outdoor play at T1 and T2 in Lockeport. In the field area, the proportion of children observed engaging in walking activities decreased from 25.3% at T1 to 21.0% at T2, while the percentage of those sedentary decreased from 60.4% at T1 to 36.0% at T2. Vigorous activity in this area increased from 14.3% at T1 to 43.0% at T2. In the playground area, the proportion of children observed engaging in walking activities also decreased from 19.0% at T1 to 16.0% at T2, while the percentage of those sedentary decreased from 39.0% at T1 to 26.0% at T2. Vigorous activity in this area increased from 42.0% at T1 to 58.0% at T2.

Table 12. *Physical Activity Levels of Child Park Users at T1 and T2 by Park Sub-Area Across All SOPARC Observations in Lockeport*

<i>Seacaps Park</i>	<i>T1</i>				<i>T2</i>			
	<i>Total</i>	<i>Sedentary</i>	<i>Walking</i>	<i>Vigorous</i>	<i>Total</i>	<i>Sedentary</i>	<i>Walking</i>	<i>Vigorous</i>
A (Field)	91	55 (60.4%)	23 (25.3%)	13 (14.3%)	14	5 (36%)	3 (21%)	6 (43%)
B (Playground)	57	22 (39%)	11 (19%)	24 (42%)	19	5 (26%)	3 (16%)	11 (58%)
Total	148	77 (52%)	34 (23%)	37 (25%)	33	10 (30%)	6 (18%)	17 (52%)

Figure 10 illustrates the percentage of child park users, categorized by perceived gender, participating in outdoor play at sedentary, walking, or vigorous activity-levels during SOPARC observations in Lockeport. During T1, 37.5% of boys observed at Seacaps were sedentary, 18.8% were engaged in walking activities, and 43.8% were involved in vigorous physical activities during outdoor play. Among girls, 59.0% were sedentary, 25.0% were walking, and 16.0% were engaging in vigorous physical activity. At T2 the percentage of boys' sedentary activity decreased to 21.0%, while walking activities increased to 21.0%, and those involved in vigorous physical activity increased to 58.0%. For girls, the amount observed being sedentary dropped to 42.9%, walking activities also decreased to 14.3%, while the percentage of girls' outdoor play observed at vigorous physical activity-levels increased significantly to 42.9%.

Figure 10. *Percentage of Child Park Users by Perceived Gender Engaging in Sedentary, Walking, or Vigorous Activity Across All T1 and T2 SOPARC Observations in Lockeport*



4.1.3 Yarmouth

In Yarmouth, four cycling and pedestrian sites were observed: Broad Brook Park at Pleasant Street (BB), Highway 1 and Prospect Street (HP), Main Street and Argyle Street (MA), and at the Tru Hotel along Highway 3 (TH). In addition, one park site was observed, Frost Park. Due to the small size of this park site, it was not broken down into sub-areas.

The number and proportion of children observed engaging in AT over all three collection days at two timepoints (T1 and T2) across sites in Yarmouth is illustrated in Table 13. At T1, a total of 213 children were observed, with approximately 50.2% of children perceived to be boys, 48.8% girls, and 0.9% whose gender was indiscernible. At T2, the total observed increased to 253, with boys making up 56.9%, girls 37.2%, and indiscernible 5.9%. The percentage of children engaging in AT by perceived gender at T1 and T2 is highlighted in Figure 11. At T1, the MA site had the highest observations with a slight increase from 128 children at T1 to 133 at T2. BB site saw an increase from 82 to 106 children from T1 to T2. Children had a minimal presence

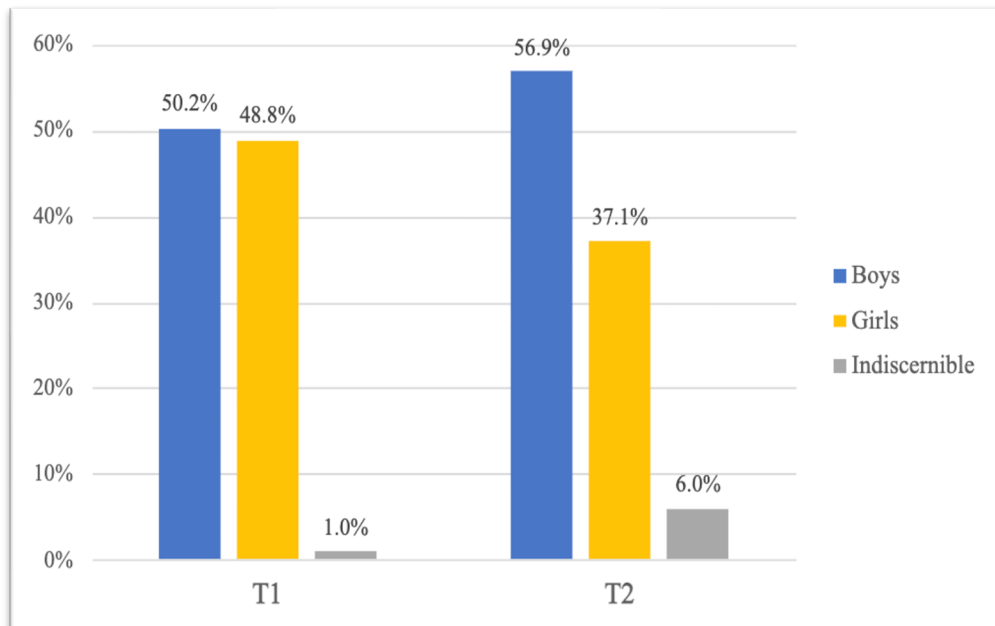
at the TH site with 2 children at T1 and 3 at T2, while HP increased from 1 child at T1 to 11 children at T2.

Table 13. Total Children Observed at T1 and T2 by Perceived Gender on All Days at Each Cycling/Pedestrian Count Site in Yarmouth

Yarmouth Sites	T1				T2			
	Total	Boys	Girls	Indiscernible	Total	Boys	Girls	Indiscernible
BB	82 (38.5%)	48 (58.5%)	32 (39.0%)	2 (2.4%)	106 (41.9%)	60 (56.6%)	40 (37.7%)	6 (5.7%)
HP	1 (0.4%)	0 (0.0%)	1 (100%)	0 (0.0%)	11 (4.3%)	5 (45.5%)	6 (54.5%)	0 (0.0%)
MA	128 (60.1%)	59 (46.1%)	69 (53.9%)	0 (0.0%)	133 (52.6%)	76 (57.1%)	48 (36.1%)	9 (6.8%)
TH	2 (1.0%)	0 (0.0%)	2 (100%)	0 (0.0%)	3 (1.2%)	3 (100%)	0 (0.0%)	0 (0.0%)
Total	213	107 (50.2%)	104 (48.8%)	2 (0.9%)	253	144 (56.9%)	94 (37.2%)	15 (5.9%)

Note. “Indiscernible” denotes children whose gender count not be identified during observation due to clothing, body posture, or other factors that made identification unclear. This category does not represent gender-diverse or gender non-conforming individuals.

Figure 11. Percentage of Children Observed Engaging in AT by Perceived Gender at T1 and T2 in Yarmouth



When considering mode choice, at T1, 85.0% of the children were pedestrians and 15.0% were cyclists, which changed to 81.4% pedestrians and 18.6% cyclists at T2 (Table 14). At T1

and T2, a higher proportion of boys were observed cycling (68.75% and 93.6%) compared to girls (31.25% and 6.4%).

Table 14. Children’s AT Mode Choice at T1 and T2 by Perceived Gender Across All Days and Count Sites in Yarmouth

Mode	T1				T2			
	Total	Boys	Girls	Indis.	Total	Boys	Girls	Indis.
Pedestrian	181 (85.0%)	85 (47.0%)	94 (51.9%)	2 (1.1%)	206 (81.4%)	100 (48.5%)	91 (44.2%)	15 (7.3%)
Cycling	32 (15.0%)	22 (68.8%)	10 (31.3%)	0 (0.0%)	47 (18.6%)	44 (93.6%)	3 (6.4%)	0 (0.0%)
Total	213	238	267	7	253	144	94	15

Note. Pedestrian mode choice included walkers, wheelchair users, passengers (child in a carrier or traveler on the back of a bike or wagon), and those using manual scooters and roller blades. “Indis.” denotes children whose gender count not be identified during observation due to clothing, body posture, or other factors that made identification unclear. This category does not represent gender-diverse or gender non-conforming individuals.

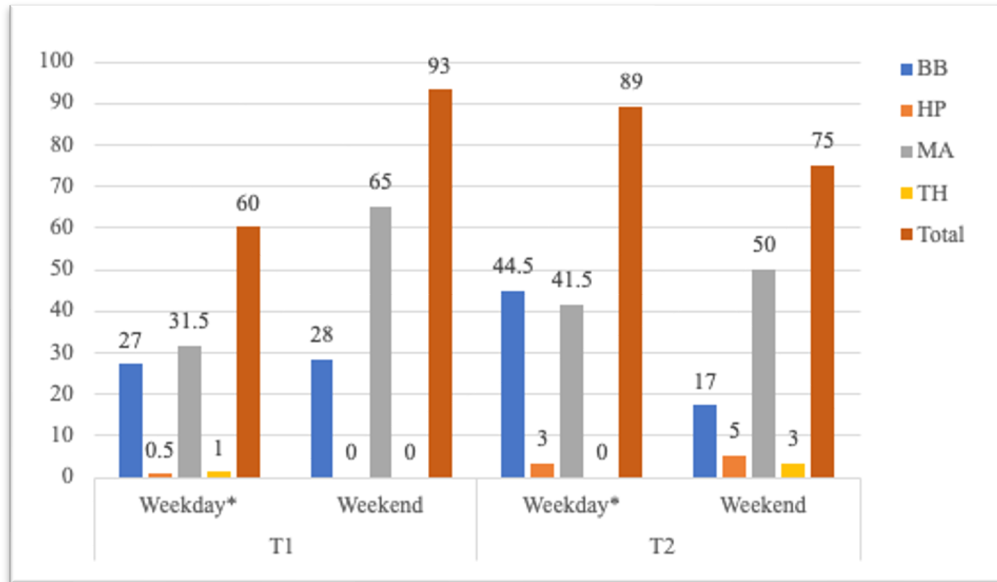
Analysis of weekday versus weekend observations showed an increase in weekday observations from a mean of 60 children at T1 to 89 at T2. Conversely, weekend observations decreased from 93 children at T1 to 75 at T2 (as shown in Table 15 and Figure 12).

Table 15. Total Children Observed at T1 and T2 by Site for Weekday Versus Weekend Pedestrian/Cycling Counts in Yarmouth

Yarmouth Sites	T1		T2	
	Weekday*	Weekend	Weekday*	Weekend
BB	27	28	44.5	17
HP	0.5	0	3	5
MA	31.5	65	41.5	50
TH	1	0	0	3
Total	60	93	89	75

Note. *Mean of the two weekday observation days

Figure 12. Total Children Observed at T1 and T2 by Site for Weekday Versus Weekend Pedestrian/Cycling Counts in Yarmouth



Note. *Mean of the two weekday observation days

It is important to consider factors that could have impacted the results collected at T1 and T2. While the weather conditions were similar between the two timepoints, with both T1 and T2 experiencing a temperature high of 16 °C, there was a slight difference in low temperatures, with a low of 7 °C at T1 and 10 °C at T2. Notably, there was light rain during the observation periods on one weekday collection day at T2, whereas T1 had no precipitation. Other than these weather variations, no significant modifying factors were observed during data collection.

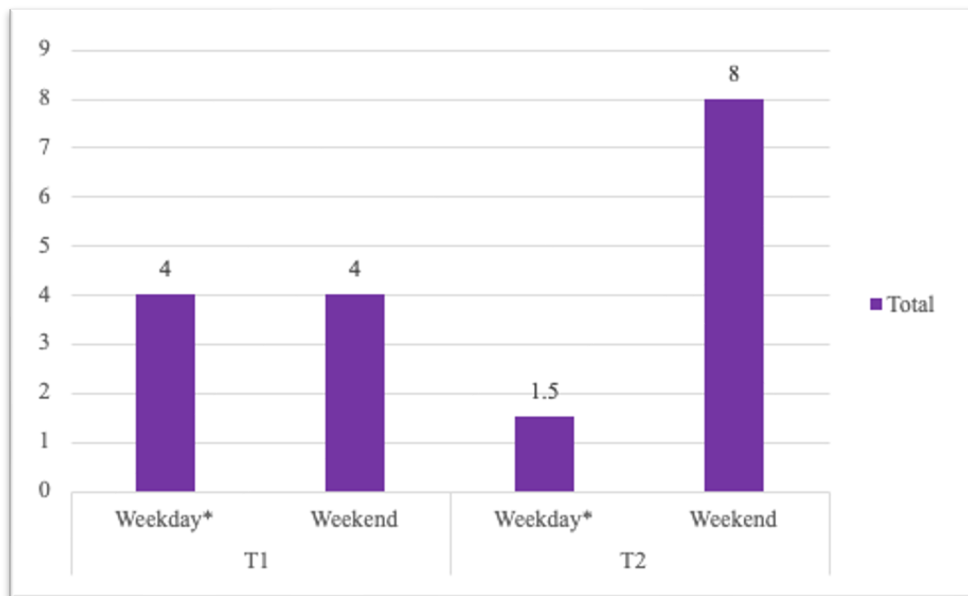
During the SOPARC observations at Yarmouth’s Frost Park, the total number of child park users decreased slightly from 13 at T1 to 11 at T2 (shown in Table 16). Additionally, the number of boys decreased from 9 (69.2%) at T1 to 5 (45.5%) at T2, while the number of girls increased from 4 (30.8%) at T1 to 6 (54.5%) at T2.

Table 16. Total Child Park Users at T1 and T2 by Perceived Gender Across Park Sub-Areas for SOPARC Observations in Yarmouth

Frost Park	T1			T2		
	Total	Boys	Girls	Total	Boys	Girls
Total	13	9 (69.2%)	4 (30.8%)	11	5 (45.5%)	6 (54.5%)

Analysis of weekday versus weekend SOPARC observations revealed a decrease in weekday observations at Frost Park, lowering from a mean of 4 children at T1 to 1.5 at T2. However, weekend observations increased from 4 children at T1 to 8 children at T2, as shown in Figure 13.

Figure 13. Total Child Park Users at T1 and T2 by Park Sub-Area for Weekday Versus Weekend SOPARC Observations in Yarmouth



Note. *Mean of the two weekday observation days

Table 17 displays the number and percentage of child park users, by perceived gender, engaging in different activity levels (sedentary, walking, vigorous) during outdoor play at T1 and T2 in Yarmouth. In Frost Park the proportion of children observed engaging in walking activities increased from 23.1% at T1 to 45.4% at T2, while the percentage of those sedentary decreased

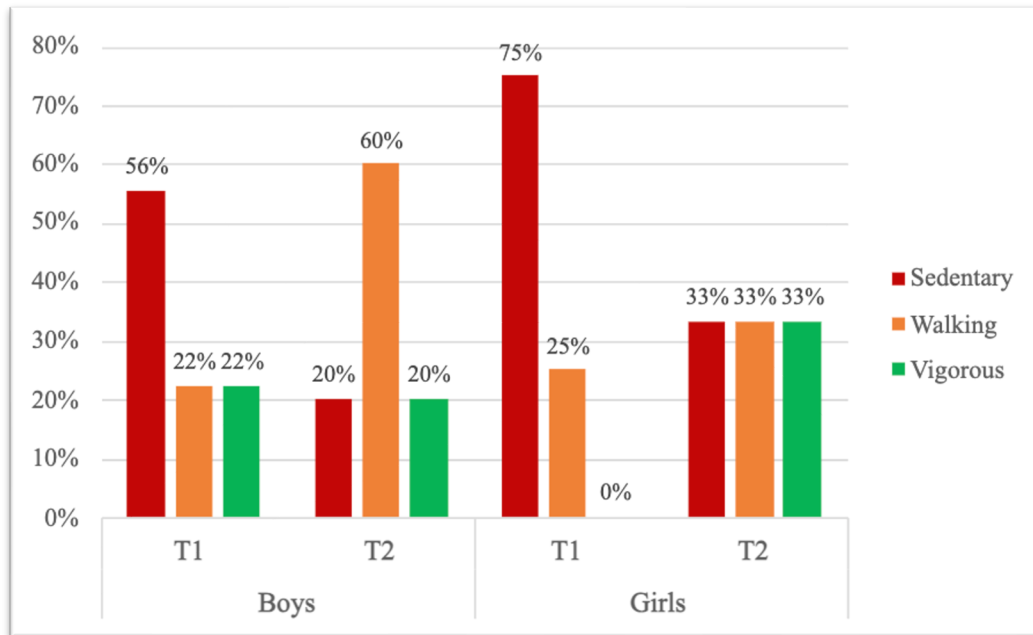
from 61.5% at T1 to 27.3% at T2. Vigorous activity in the park area slightly increased from 15.4% at T1 to 27.3% at T2.

Table 17. *Physical Activity Levels of Child Park Users at T1 and T2 by Park Sub-Area Across All SOPARC Observations in Yarmouth*

<i>Frost Park</i>	<i>T1</i>				<i>T2</i>			
	<i>Total</i>	<i>Sedentary</i>	<i>Walking</i>	<i>Vigorous</i>	<i>Total</i>	<i>Sedentary</i>	<i>Walking</i>	<i>Vigorous</i>
Total	13	8 (61.5%)	3 (23.1%)	2 (15.4%)	11	3 (27.3%)	5 (45.4%)	3 (27.3%)

Figure 14 illustrates the percentage of child park users, categorized by perceived gender, participating in outdoor play at different activity-levels during SOPARC observations in Yarmouth. During T1 at Frost Park, 55.6% of boys were observed to be sedentary, 22.2% were engaged in walking activities, and 22.2% were involved in vigorous physical activities during outdoor play. Among girls, 75.0% were sedentary, 25.0% were walking, and none were engaging in vigorous physical activity. Notable changes in children’s activity levels by gender were observed at T2. The percentage of boys’ sedentary activity decreased to 20.0%, while walking activities increased to 60.0%, with a similar proportion engaging in vigorous physical activity at 20.0%. For girls, the amount observed being sedentary dropped significantly to 20.0%, with an increase in walking activities to 33.3%, while the percentage of outdoor play observed at vigorous physical activity-levels increased to 33.3%.

Figure 14. *Percentage of Child Park Users by Perceived Gender Engaging in Sedentary, Walking, or Vigorous Activity Across All T1 and T2 SOPARC Observations in Yarmouth*



4.2 Phase 2: Qualitative Findings

4.2.1 Document Review

This document review involved analyzing CoM planning and reporting tools from the three communities under study, focusing on phases 1 and 2 of the CoM evaluation. The objective of the review was to gain a comprehensive understanding of the interventions employed and their geographical distribution within each community. This understanding helped to determine what factors may have contributed to the observed changes in children’s AT and outdoor play.

Table 18 summarizes the findings from this review, detailing the built environment and social environment interventions that occurred in each CoM community from Phase 1 (April 2022 – March 2023) and Phase 2 (April 2023 – Sept 2023). This encompasses all interventions that would have occurred between the two count timepoints assessed above. Notably, the review revealed that children were not involved in the design of any built or social environment

interventions listed. However, some interventions were implemented in partnership with local schools and included participation from children.

Table 18. Community Actions from Phase 1 and Phase 2 of the CoM Program

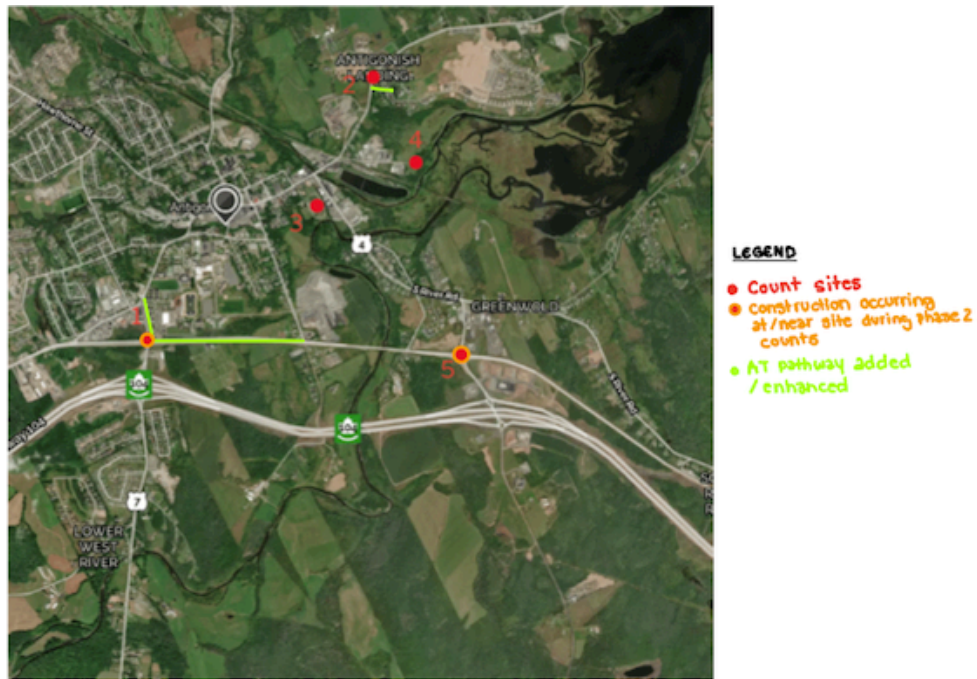
<i>Community</i>	<i>Built Environment Interventions</i>	<i>Social Environment Interventions</i>
<i>Antigonish</i>	<p><u>Community AT Network Project</u> Ongoing AT initiative throughout the Town and County to enhance connectivity. Completed the Mount Cameron Trail Connector (crossing of Highway 337 and Mount Cameron) and 1 km stretch of a multi-use pathway along Highway 4.</p> <p><u>Signage</u> AT signage completed and installed at the Mount Cameron Trail Connector.</p> <p><u>Bike racks</u> 5+ bike racks installed throughout the community including at a local school in Paqtnekek Mi'kmaw Nation.</p> <p><u>Outdoor Rec Grants</u> 11 Grants awarded for community hubs to enhance outdoor spaces and support projects that encourage movement (e.g., support for trail and outdoor rink maintenance, disk golf gear, playboxes, etc.)</p>	<p><u>Leader Training</u> In collaboration with NS Walks, 5 NS Walks Leaders were trained. In partnership with Cycling NS, 5 HopOn instructors were trained and certified. HopOn is a learn-to-ride cycling program. One free program was offered to newcomer children.</p> <p><u>Move Navigator</u> Hired a full-time staff member to support the MYM Antigonish initiative in key environments (school, workplace, healthcare, community hubs).</p> <p><u>MYM Marketing Campaign</u> Hired a professional content creator and municipal webpage designer to create marketing content and a webpage for the MYM Antigonish initiative. Content was used for social media and website communications.</p> <p><u>MYM Antigonish Community Celebration</u> Organized a MYM Antigonish launch event to introduce community members to CoM and promote the MYM initiative. Held the event in partnership with local schools. MYM swag distributed at this event. Included a bike rodeo, e-bike testing, and showcase of community groups encouraging simple movements (e.g., garden group, community trail organization, etc.).</p> <p><u>Outdoor Movement Opportunities</u> Provided free or subsidized outdoor movement opportunities to community members, run by certified/trained outdoor leaders. Included 2 child cycling programs, bike/helmet loan options, Antigonish Boat Club programs, and guided hikes.</p> <p><u>Access to Facilities</u> In partnership with the Township, 20 free skates and 8 free swims were run at the local arena and pool. In addition, an equipment loan program was offered. All sessions reached full capacity.</p>
<i>Lockeport</i>	<p><u>AT Amenities</u> Bench locations were installed to provide frequent rest spaces around the Seacaps Park and the local walking trail. Point of decision signage was also installed along popular community walking routes.</p> <p><u>AT Pathway</u> AT pathway was paved along one of the Town's main streets (Hall Street). A rumble strip and painted lines were completed to differentiate the walking surface from the road.</p> <p><u>Concrete Connectors</u></p>	<p><u>MYM Marketing and Events</u> In consultation with MYM partners, a flyer was disseminated to introduce community members to CoM and promote the MYM initiative. Also, a MYM Grand Launch event was held, featuring various physical activities and educational booths. Other activities took place in the week before the official launch and promoted as MYM Lockeport Grand Launch Week, such as a walking event on NS Walks Day, attracted participation from over 150. MYM swag was distributed at community recreation and MYM launch events.</p> <p><u>Multi-Generational Walking Event</u> 45 grandparents and "grand buddies" participated in a community walk event as well as the entire Lockeport Elementary staff and student body, 90+ children. Members of the CoM Leadership team distributed MYM promotional material at the event.</p> <p><u>Bike Initiatives</u></p>

<i>Community</i>	<i>Built Environment Interventions</i>	<i>Social Environment Interventions</i>
	<p>Two concrete walkway connectors were built in September of 2023. One connects tennis courts to South Water Street and the other is in Seacaps Park to connect the pavilion where community events and festivals are held to the accessible ramp and washrooms at the facility.</p> <p><u>NS Walks Rural Sign Program</u> Rural walking signs distributed to participants in the NS Walk Leader training program. 1 sign currently displayed in the Lockeport area.</p> <p><u>Community Playbox</u> A permanent community playbox was installed at a local school soccer field.</p>	<p><i>Bike Rodeo:</i> Town staff and community volunteers offered a bike rodeo program at the Town Park. As a result, 6 community children received bicycle safety training.</p> <p><i>Head-to-Head Ride:</i> An 11km community bike ride event was run by the CoM Leadership team.</p> <p><i>Bike Loan Program:</i> A bicycle storage barn and bike storage racks were purchased and installed for the Town’s ongoing bicycle loan program.</p> <p><u>Leadership Training</u> 7 NS Walks Leaders were trained in the Town of Lockeport. Nova Scotia Active Smarter Kids training provided to 23 Lockeport Elementary and Highschool staff, and 2 members of the CoM Leadership team, to promote physically active learning in local schools. Also, 15 children from Lockeport area received training in fundamental movement skills and physical literacy (Active Start Soccer), Making Tracks Bicycle training, outdoor play and loose parts, gamesmanship and creative play leadership, as well as access and inclusion.</p> <p><u>Community Inventory</u> In partnership with Lockeport High School staff and students, an inventory of local outdoor spaces, ‘Green Guide’ was created and distributed across the community.</p>
<i>Yarmouth</i>	<p><u>Lake Milo AT Project</u> Supported ongoing Lake Milo AT project. Includes the development of a new walking and cycling route along Lake Milo.</p> <p><u>Sidewalk Additions</u> Supported the development and installation of 3 new sidewalk projects in Hebron, Greenville Road, and Port Maitland to increase pedestrian safety across Yarmouth County. In addition, sidewalk connection completed along Hayley Road.</p> <p><u>Bike Lanes</u> New painted bike lanes developed along Parade Street, in line with the Town of Yarmouth’s AT strategy.</p> <p><u>Splash Park</u> Supported early fundraising efforts and celebration event for the new Yarmouth Splash Park.</p> <p><u>Community Playbox</u> Community playboxes purchased, including games and toys. Will be installed around the community over the next year.</p>	<p><u>Leader Training</u> In collaboration with NS Walks, several community members and Yarmouth staff received NS Walk Leader training.</p> <p><u>Community-based Walks</u> Active Soles Walking Group started May 2022. Walk occurred weekly at consistent time. Routes changed weekly to highlight various areas around Yarmouth and new AT infrastructure.</p> <p><u>Walk Challenges</u> Various walk events/challenges held throughout the year. Included a ‘Walk to Summer’ challenge encouraging participants to track their daily step, NS Walk Day event, and Lighthouse Route Challenge.</p> <p><u>BWELL Challenge</u> Local workplace movement challenge. Municipal employees given 2 ‘wellness breaks’ to encourage simple movement throughout the day.</p> <p><u>Peer Mentorship</u> In partnership with local Health Promoting Schools, supported the ‘After the Bell’ program, a peer mentorship program for the empowerment of Junior High girls as student walk leaders.</p> <p><u>Loaner Kits and Bike Loan Program</u> Free play/sport equipment kits and bike loan program made available through Yarmouth Recreation.</p> <p><u>MYM Marketing and Events</u> Website, social media content, and press releases disseminated across community networks to promote the MYM Yarmouth initiative. MYM swag was distributed at community events. Partnered with several organizations for MYM Yarmouth Expo (launch event), which took place June 2023, at the Mariners Centre.</p> <p><u>Families at Play</u></p>

<i>Community</i>	<i>Built Environment Interventions</i>	<i>Social Environment Interventions</i>
		<p>With local NSCC Early Childhood Studies students, weekly family play sessions were established at the NSCC to promote running, jumping, and play with children.</p> <p><u>Community Scavenger Hunts in Trails and Parks</u> Various scavenger hunt events were held throughout the year in trails and community parks</p>

In Antigonish, built environment interventions included completion of a 1 km multi-use path along Highway 4 (as part of a Community AT Network Project), completion of the Mount Cameron Trail Connector, installation of AT signage and bike racks, and the enhancement outdoor spaces for movement through the distribution of recreation grants. A map of illustrating the geographic location of built environment interventions is provided in Figure 15. Social interventions comprised leader training in collaboration with NS Walks and Cycling NS, hiring a Move Navigator, launching an MYM marketing campaign, and organizing a MYM Antigonish community celebration in partnership with local schools. In addition, activities were performed to increase equitable access to outdoor movement opportunities as well as physical activity facilities and equipment.

Figure 15. Map of Built Environment Interventions in Antigonish from Phases 1 and 2 of the CoM Program



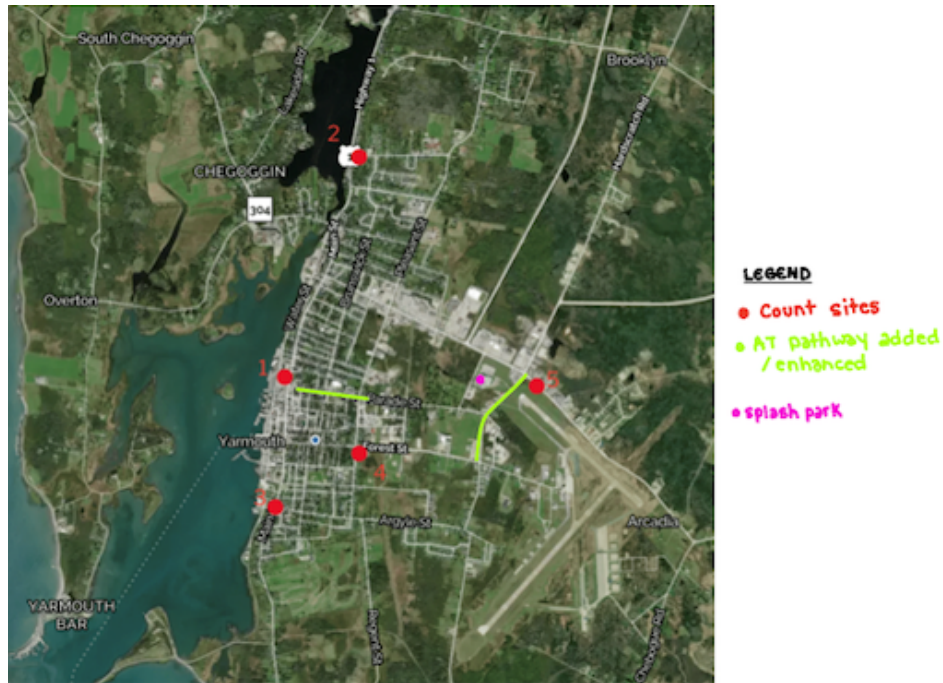
In Lockeport, built environment interventions involved installing benches, AT signage, paving an AT pathway, and constructing concrete connectors. A map of illustrating the geographic location of built environment interventions is provided in Figure 16. Social environment efforts included disseminating marketing materials, hosting a MYM Grand Launch event, organizing a multi-generational walking event, and running various bike initiatives. Also, leadership training was conducted for community members, children, and local school staff. Additionally, a community inventory of outdoor spaces was created.

Figure 16. *Map of Built Environment Interventions in Lockeport from Phases 1 and 2 of the CoM Program*



In Yarmouth, built environment interventions supported the Lake Milo AT Project, sidewalk additions, new bike lanes, and initial efforts for a community splash park. A map of illustrating the geographic location of built environment interventions is provided in Figure 17. Social interventions included NS Walk Leader training, establishing a community walking group, various walking challenges, and a workplace movement challenge. Other activities involved peer mentorship programs for children, providing loaner kits and bike loans, MYM marketing and events, family play sessions, and community scavenger hunts.

Figure 17. *Map of Built Environment Interventions in Yarmouth from Phases 1 and 2 of the CoM Program*



4.2.2 Content Analysis

The aim of this content analysis was to deepen the understanding of the socioecological constructs influencing children’s AT and outdoor play, as well as to capture the perceptions and experiences of these changes from both community leaders and children. Analysis was performed on the focus group transcript and demographic questionnaires obtained during primary data collection in one of the three CoM communities, the County of Antigonish. The focus group session lasted approximately 60 minutes. The discussion focused on experiences, attitudes, and perceptions related to children's AT and outdoor play across the community. A total of 11 members of Antigonish’s CoM leadership team and 5 children living in Antigonish between the ages of 13 to 18 years old participated in this study. A summary of participant’s demographics is presented in Table 19 below.

Table 19. *Focus Group Participant Demographics*

ID	Age (years)	Gender	Ethnicity	Residence (urban/suburban/rural/not described)
A1	54	Male	White	Urban
A2	41	Female	White	Rural
A3	52	Female	White	Not described
A4	75	Male	White	Rural
A5	33	Female	White	Not described
A6	24	Female	White	Urban
A7	40	Female	White	Not described
A8	47	Female	White	Not described
A9	49	Male	White	Urban
A10	41	Female	White	Suburban
A11	49	Male	White	Suburban
C1	18	Male	White	Urban
C2	17	Male	White	Suburban
C3	15	Female	White	Urban
C4	13	Female	White	Rural
C5	14	Male	White	Suburban

Note. ‘A’ indicates and adult participant, ‘C’ indicates a child participant.

As described in the methodology chapter, analysis was conducted in NVivo, using a deductive approach. The unit of analysis selected for this study was theme, to ensure the contextual richness and complexity of responses was captured. Next, following Zhang and Wildemuth (2009), eight stages of qualitative content analysis, a preliminary codebook was developed detailing the categories and coding schemes used to guide the coding process. Categories/codes were informed by the research questions and the socioecological model. This preliminary codebook was first tested on a small section of the focus group transcript to ensure

the codes fit with the data and any needed changes could be made prior to coding the rest of the data. The test coding demonstrated that most codes were suitable for the data. However, additional codes were required due to emergent themes that were not initially anticipated. Specifically, new themes concerning environmental influences and parent-child interactions were identified, warranting the addition of new codes to adequately capture these aspects. The final codebook shown in Table 20 lists the categories and codes applied during the coding process.

Table 20. *Final Codebook*

Category	Code	Definition
<i>Research Question 1: Differences in Children's AT and Outdoor Play from Phase 1 to Phase 2</i>		
1. Types of AT Activities	1.1: Walking	Instances where children walk as a form of AT.
	1.2: Biking	Instances where children use bicycles as a form of AT.
	1.3 Other activities (running, scootering, etc.)	Any other forms of AT not categorized above.
2. Types of Outdoor Play Activities	2.1: Structured	Organized sports activities such as soccer or basketball.
	2.2: Unstructured	Unstructured play activities like running or playing tag.
3. Frequency of AT and Outdoor Play	3.1: Daily	Activities that occur every day.
	3.2: Weekly	Activities that occur at least once a week.
	3.3: Occasionally	Activities that occur sporadically, less than weekly.
	3.4: Rarely or Never	Activities that occur infrequently.
4. Settings for AT and Outdoor Play	4.1: School	Activities occurring in or around school premises.
	4.2: Home Neighborhood	Activities occurring in the child's home neighborhood.
	4.3: Parks/Playgrounds	Activities occurring in parks or playgrounds.
	4.4: Nature trails	Activities occurring in nature trails.
	4.5: Other	Activities occurring in any other settings not categorized above.

Category	Code	Definition
5. Barriers to AT and Outdoor Play	5.1: Weather Conditions	Weather-related factors that hinder AT and outdoor play.
	5.2: Safety Concerns	Safety issues that limit AT and outdoor play.
	5.3: Lack of Access to Spaces	Limited access to appropriate spaces for AT and outdoor play.
	5.4: Lack of Opportunities	Limited opportunities available for AT and outdoor play.
	5.5: Parental or Caregiver Restrictions	Restrictions imposed by parents/caregivers affecting AT and outdoor play.
	5.6 Attitudes and perceptions	Negative attitudes or perceptions towards AT and outdoor play.
6. Facilitators of AT and Outdoor Play	6.1: Community Programs	Community-organized programs that encourage AT and outdoor play.
	6.2: School Initiatives	School-led initiatives to promote AT and outdoor play.
	6.3: Parental Support	Support from parents facilitating AT and outdoor play.
	6.4: Infrastructure	Availability and quality of infrastructure supporting AT and outdoor play.
	6.5 Availability of play spaces	Access to adequate spaces for AT and outdoor play.
	6.6 Connectivity, proximity, and access to amenities	Ease of access to play spaces and amenities using AT
	6.7 Supportive municipal policies	Policies at the municipal level that support AT and outdoor play.
	6.8: Lack vehicle ownership	Lack of personal/family vehicle ownership facilitating AT
7. Changes between phase 1 and phase 2	7.1: Changes in AT	Changes in AT from phase 1 to phase 2.
	7.1 Changes in outdoor play	Changes in outdoor play from phase 1 to phase 2
<i>Research Question 2: Gender Differences in AT and Outdoor Play from Phase 1 to Phase 2, and Gender Proportion Changes</i>		
8. Participation in AT and Outdoor Play by Gender	8.1: Boys	Participation of boys in AT and outdoor play.
	8.2: Girls	Participation of girls in AT and outdoor play.
	9.1: Activities preferred by boys	Specific activities favored by boys.

Category	Code	Definition
9. Types of AT and Outdoor Play Activities by Gender	9.2: Activities preferred by girls	Specific activities favored by girls.
10. Frequency of AT and Outdoor Play by Gender	10.1: Frequency (boys)	Frequency of participation for boys.
	10.2: Frequency (girls)	Frequency of participation for girls.
11. Settings for AT and Outdoor Play by Gender	11.1: Settings (boys)	Settings where boys engage in AT and outdoor play.
	11.2: Settings (girls)	Settings where girls engage in AT and outdoor play.
12. Barriers to AT and Outdoor Play by Gender	12.1: Barriers (boys)	Specific barriers experienced by boys.
	12.2: Barriers (girls)	Specific barriers experienced by girls.
13. Facilitators to AT and Outdoor Play by Gender	13.1: Facilitators (boys)	Specific facilitators experienced by boys.
	13.2: Facilitators (girls)	Specific facilitators experienced by girls.

The content analysis of focus group transcripts and demographic questionnaires yielded several key themes regarding socioecological factors (individual, social environment, built environment, and policy environment) that influence children’s engagement in AT and outdoor play. The findings for each theme are summarized below.

4.2.3 Individual-Level Factors

This theme explores how individual-level factors such as gender, age, ethnicity, attitudes, behaviours, motivations, knowledge, and skills influence children’s engagement in AT and outdoor play. The analysis revealed that all child participants engaged in AT and outdoor play, as well they were more inclined to engage in AT during their leisure time, as opposed to as a form of commute. For example, all children noted their main form of commute to school was by bus. Both adults and children said time was the major determinant of choosing to engage in AT. Child and adult participants also identified weather as a major determinant of AT engagement. Poor weather conditions, such as rain and cold temperatures, were cited as barriers to participation,

with some participants attributing this to the worsening quality of pathways. For example, one adult stated:

“I think the difference from the 22° average [in 2022] to the 16° average [in 2023] when you were here, that's a big factor, because when the sun's out, people go to the [Antigonish Landing] trail, but when it's raining, and it gets kind of mucky it's not as appealing.” (Participant A1)

Participants also noted that children predominately engage in structured forms of outdoor play, such as organized sports. For instance, one adult remarked:

“Well, you know that stat that was quoted earlier, 70% of Nova Scotia youth are participating in organized sport. Honestly, I wonder if that's a good thing or a bad thing because it seems now that the only way... that we can have our kids be active is to sign them up for something. There's very, there's less... unstructured activities.” (Participant A8)

Gender differences were also alluded to, with boys reporting higher participation in activities like biking and physically active play, whereas girls preferred to engage in walking and less physically intense activities. For example, one boy noted, *“...on the [school] field, it seems to be the boys are more active.”* (Participant C2). While one girl said *“I don't bike usually. [My brother] bikes, but I usually just walk”* and *“Me and my friends...we don't really do any sports. When we go out at recess, we'll just either walk or, like, sit on the field”* (Participant C3).

Attitudes and perceptions towards AT and outdoor play were positive. However, attitudes were generally more positive for walking over biking, *“I love biking. It's just I like walking to places better.”* (Participant C3) and *“I feel like there's definitely more people like walking to school than there is biking”* (Participant C1). Additionally, one adult mentioned that younger children

tend to have a lack of interest or perceive outdoor play as less attractive compared to digital entertainment:

“My oldest is in grade nine, he’s 14 and maybe by the time he was 12 he was pretty much free rain going after school to activities or walking with friends from school and that was awesome. The next two... not so much. They’re not there yet, so they’re on the bus home and they’re looking to put TV on at home. And you got to, like, kick them outside and fight and fight. And it would be awesome if they had something to do after school and get on the bus and come home.” (Participant A11).

Additionally, it was noted that older children (ages 16-18) with access to a personal or family-owned vehicle prefer driving instead of engaging in AT and outdoor play. For instance, child participants expressed:

“I feel like at the high school there’s a big split between ages, because the younger grades, like nine and ten, they can’t drive and bring cars to school...So at lunch you’ll see a big parade of grade tens going up to James Street or over to Brendan’s [convenience store] even. They go there, but then once they hit grade 11 and 12 and people are getting their licenses you don’t really see them walking home from school. Everybody just goes and gets in their car and drives home pretty much.” (Participant C2)

It was also noted that families without a vehicle participated in AT more frequently out of necessity and that neighbourhood populations with newcomer families, such as near the Beach Hill Roundabout walked to reach services and amenities, despite limited safe routes for AT, *“there would be a lot of newcomers that would be having to walk.”* (Participant A5) and *“...I know some [newcomer] families are in some housing at the bottom of the Beach Hill Rd. So, they... could be walking to Sobeys on that route... But it’s a high traffic zone”* (Participant A11).

Knowledge and skills may have contributed to observed gender differences. Participants noted that a lack of awareness about available movement programs was a barrier to male's engagement, "*I assumed that [the Keep Well program] was a woman's program until you said that cause I've never seen a man at one.*" (Participant A6). However, participants also remarked that males' perceptions of skill and safety may contribute to increased male participation in biking compared to females, "*...I don't think it's programming, I think it's more... I think men are probably comfortable. The bike shop had some rides...I think it was more male dominated.*" (Participant A1).

4.2.4 Social Environment Factors

The social environment also significantly influences children's participation in AT and outdoor play. Parental influence and role modeling was particularly impactful. Children stated that their parent's support for AT and outdoor play contributed to them moving more. For example, one participant said, "*I've been encouraged [by my parents] to bike to school a few times*" (Participant C5). Adults placed high value on encouraging their kids to move, "*my little guy, he's three, so, I'll always take his strider bike*" (Participant A2). Some adult participants also mentioned their children depend on them to get to and from structured play activities and programs:

"We have this highly, like, highly structured sport, but it's that sport that's for fun...that kids could just get themselves to after school, we have less of that. We have this highly structured sport, that's like, man you gotta be there at 4:00 or you're doing burpees. So, your parents are driving you to make sure you're there. You know, you can't just have the kid get themselves there and maybe they're a bit late, that's okay. So, we have less of

that, like the tennis lessons, that are kind of causal sport, but more highly organized sport” (Participant A8).

However, the importance of parental support lessens as children age and gain independence and autonomy. Conversely, parents’ safety concerns sometimes restricted children's freedom to engage in these activities, *“I have a kid that's in grade nine... it's not safe to send him out on his bike all the time... It worries me...I know a lot of drivers are not really respectful of kids, or anybody, on bikes.”* (Participant A5) and *“...as a mom of four kids from three to 10, I don't let my kids go on the road because it is a connector road, and it's much too fast, and there's no room. And it's like, big trucks, fishermen, turns, and bears”* (Participant A2) and *“As a parent I can tell you, you're definitely more at ease with the kids walking to their destinations versus taking their bikes to the destination.”* (Participant A9).

A car-centric culture was a big barrier to engagement in AT, *“I don't think there's a lot of traffic, people that drive, that think [cyclists] should be there. You know, it's still the culture. We still gotta build that culture. Like it's not there.”* (Participant A1) and *“I just think we're so car centric...And the less cars, the more people comfortable moving and walking. It's this whole shift out of vehicles. There's too much driving”* (Participant A11).

Role modeling in school and supportive school initiatives were also noted as important enablers, encouraging and influencing children to engage in outdoor activities:

“...today when I picked her up there was a teacher who had their class outside meeting at the tulip garden...I thought that was really cool. She was giving them some weeding tips and teaching them what flowers to leave. The whole class was out.” (Participant A2)

Additionally, many child participants stated they engage in physical activity through school programming, such as track and field teams. School restrictions for younger children decreased

their ability to get outside and move during break periods. For example, it was noted by child participants that younger grades, such as eight and nine, were not allowed to leave school on breaks unless accompanied by a parent, whereas older grades were free to move as they please.

Peer influence and social norms played a role in gender differences in AT and outdoor play, with girls mentioning they engage in less active outdoor play activities at school as well as boys mentioning they are more active at school. Adult participants also mentioned gendered social norms regarding engagement in AT, *“Biking gets... Yeah, observationally is more male. But walking you think would be the other way around”* (Participant A9).

Additionally, community support through programs emerged as a facilitator. Participants indicated community initiatives such as sports leagues, community training programs, and organized group activities promoted children’s engagement in AT and outdoor play. For instance, one adult participant mentioned, *“...the community [center] ...that’s where a lot of kids would learn to bike”* (Participant A2). Another adult participant mentioned these programs provided structured opportunities for children to engage in physical activity:

“...we have a very strong track and field and running community in Antigonish. So, the kids would leave...every day after school to [go to] the StFX track. So, they would walk after school, and they would do a group work out there and then they would get picked up there. And that happens in the fall as well. That’s when our cross-country program operates or runs. So, that would be a mix of kids from the town and the county, because they’re leaving school and they’re walking directly to that program, and they’re engaged in physical activity there.” (Participant A7)

However, participants expressed a desire for more unstructured opportunities for children to engage in movement:

“We do get a lot of kids here [at the library] after school and a lot of kids want to move. And we’ll have them try to take their scooters and stuff through and it’s like this isn’t the place for it. I wish it could be, but it’s not. So, I wish there were more opportunities. It’s great having the skate park... just for that unstructured time to move, it’s good because I think people want it.” (Participant A5)

One adult also noted getting their children to structured activities decreased their own physical activity, for example:

“...if they're active in activities like organized activities, organized sports, I'm less active because all we're doing is driving people. I find that a challenge... It's crazy. And when I'm in the car all the time I get cranky. But if there was a way to fix all that, that would be pretty good, because we're trying to do it so they're active, but we're less active and they're getting driven there and anyway it's all a bit much, but you just do it, right, to get them to activities.” (Participant A11)

A lack of unstructured opportunities children for children to engage in outdoor play and AT close to home was a barrier to engagement.

4.2.5 Built Environment Factors

The built environment is a significant determinant of children's ability to engage in AT and outdoor play. Access to parks, playgrounds, and nature trails was frequently mentioned as a facilitator. Participants mentioned, *“I particularly think up near the elementary school, that park seems to have gathered more and more people. I drive through every once and a while... I see them along the road, they’re biking to the park and away.”* (Participant A4) and *“One of the reasons [the trail is] so popular is it's along the water, but it's a mile...it's a perfect distance and*

it's beautiful and it's quiet. So, it's like our primary little getaway for most people.” (Participant A11).

Participants from rural areas valued the natural spaces available to them, which offered ample opportunities for outdoor play and physical activity, *“Me and my sister, in the summer, we bike down to the beach, it’s just, like, a minute away.”* (Participant C4) and *“...there is a great rail system...That's right in Arisaig. There's the Eigg Mountain trails as well as Frenchman Barnes trails. Which, [C4's] family uses quite a bit. Their property connects to it”* (Participant A2). In contrast, participants stated more urbanized areas sometimes lacked safe AT infrastructure and traffic calming measures, *“Well, I would say we...[need] more bike lanes or more walking spaces...there’s not really any sidewalks.”* (Participant C5) and:

“I volunteer with a girl guides group in town, and we’ve been taking the kids up [to Mount Cameron] to sell cookies lately because it’s safer than in town and the house are close together. Even if there’s not a sidewalk, the traffic isn’t as fast, like it’s wider and it’s not as busy” (Participant A6).

As well, urban areas were often high traffic areas and overcrowded, deterring individuals from wanting to access these places, as one child remarked:

“It's hard to bike on, like, Main Street and Hawthorne, like the bigger roads, sometimes with like trucks going by like there's always trucks on Main Street and there's not a lot of room to, like, have a bike. And if you want to go on the sidewalk, well, there's like people on the sidewalk. So, it's just not a ton of room there.” (Participant C1)

This point was also emphasized by an adult participant:

“...I find in our area, like, there's only certain routes. And everyone has to use the same route. There's no options. There's no bypass roads or ring roads. Like some communities,

right. They have circumferential roads or ring roads. We don't have any of those...there's one road into town, everyone's on it.” (Participant A3)

Infrastructure for AT, such as good quality sidewalks and bike lanes played a vital role in enabling AT. Both adult and child participants attributed new AT infrastructure such as multi-use paths and roundabouts to increased engagement in AT:

“The roundabouts key for the residential coming down to [highway] number 7, because now you don't have to cross a double road. It's a lot safer, easier to walk, and you don't feel like you're stopping traffic.” (Participant A9)

“Yeah, it's much safer.” (Participant C3).

“With the roundabout, there has been an increase. I've noticed more people taking their bikes, even just down to the roundabout and turning around, coming back. And the corridors being used quite a bit now. It's nice.” (Participant A9).

Connected infrastructure made it easier and safer for children to walk or bike to various destinations, thus promoting AT as a viable option. Conversely, poor infrastructure, lack of bike paths, and traffic calming measures acted as barriers. One child mentioned they do not safe biking routes unseparated from vehicle traffic, *“I'm not as comfortable biking as I am driving just cause your kind of, like, you know the whole-time cars are kind of trying to avoid you and go around you and you're just kind of thinking about that”* (Participant C1). Furthermore, an adult participant noted:

“[The speed limit is] 80km/h to 90km/h, but people go 110km/h. Compared to when I grew up, we would be on our bikes, zipping down at like six or seven years old to your neighbors. And now, like, I can't let my kids do it because it's too dangerous.”

(Participant A2).

Additionally, lack of connectivity and proximity of AT infrastructure and outdoor plays spaces to amenities and home neighbours was a significant barrier. For instance, near the Beach Hill Roundabout it was noted, *“There's no residence there. There's nothing. It's kind of a dead zone”* (Participant A3). Further, one participant mentioned their family's biking has decreased due to few connected bike lanes, *“Just with the lack of ability to go from point a to point b and then you just lose interest of [biking]. So, we tend to walk to our destinations”* (Participant A9). Some adult participants also said having spaces designed for children to engage in unstructured physical activity and outdoor play is important for engagement, *“There's a fairy garden in there. So, the kids would like to go there. There's some geocaching. So, there's some intended spots [for children]”* (Participant A1).

The availability of safe and accessible spaces for AT and play is crucial for encouraging children's participation. Most notably, safety concerns were significant obstacles to AT and outdoor play. Issues such as a lack of separated pedestrian pathways and safety features was mentioned numerous times by adults and children. For example, one female participant stated:

“...Good lighting, especially like, walking as a woman at night, I prefer to have good lighting. And I like when there's like a median between the road, like a grass median, between the road and the sidewalk. It feels a little better, especially at night with all the bright lights and stuff.” (Participant A6).

Participants indicated a need for safer, more secure environments to encourage more frequent AT and outdoor play.

4.2.6 Policy Environment Factors

Lastly, policy environment factors also influence children's AT and outdoor play behaviours. This includes supportive municipal policies and action plans for AT and outdoor

play. However, participants strongly emphasized a lack of support and coordination among government departments for safe AT infrastructure:

“...the big problem is we've got the highway. It's a 50 zone through the village. We've gotten a walking path on each side of the highway put in by a revision two years ago. We said we want this to be a wider road so it can be safer... So, we've got that, but we don't have a crosswalk. And they've done the traffic studies and I think the same things happened, up at Mount Cameron. The traffic studies don't support a proper crosswalk, and that is frustrating...People would walk from their homes to the school...more so if they could safely cross the road. So, I'm not sure how we can influence that.” (Participant A4)

“...we tried to get one coming out of our subdivision, like in front of Brendan's convenience store, and it's just fast there. But, they said there's already a crossbar. They count the crossbar right in front of Brendan's, the one that goes right up. But, kids aren't going to up the hill, you know, they're going to go directly across the street. And there's hundreds of kids, but they, you know, they just don't support that. I hear you.”
(Participant A1)

Investing in AT infrastructure was seen as essential. Participants noted the need for local government efforts to create more walkable and bike-friendly communities:

“And the planning doesn't consider this. I don't think we're there yet. Like, this is a good move, the corridor. But, correct me if I'm wrong, but the new bridge that put in at the start of the number seven that they've been working on for years. Right by the Westbrook Road. There's no walking lane on that. It's a brand-new bridge. And, like, there's no pedestrian lane on it...They just did how many years building that bridge and putting it

in...A little bit extra cost and they could have had a dedicated pedestrian lane, but there isn't.” (Participant A11)

Participants also suggested there is a need for stronger reinforcement of government policies:

“Yeah, a lot of the rural roads are... The drivers are so fast. People, especially in the county, just don't feel safe walking on the roads. I don't know what the solution is. There are speed limits, but people don't really follow them very well.” (Participant A2)

CHAPTER 5: DISCUSSION

This chapter presents an in-depth summary of findings derived from the analysis of both quantitative and qualitative data. It interprets and integrates the study's findings, drawing upon relevant literature. Following this, the chapter discusses the strengths and limitations of the study, the significance and implications for future research and practice, and provides recommendations and future directions for the field of health promotion.

5.1 Summary of Findings

Descriptive analysis of pedestrian and cycling counts alongside SOPARC observations was employed to assess differences in children's AT and outdoor play before and after built and social environment interventions within three CoM communities (Antigonish, Lockeport, and Yarmouth). Several quantitative hypotheses were explored, and the findings are outlined below:

Hypothesis 1. assumed that children's levels of AT and outdoor play would increase from phase 1 to phase 2, with more active outdoor play observed in phase 2. The data partially supported this hypothesis in all three communities. In Antigonish, the number of children observed engaging in AT increased from 56 in phase 1 to 63 in phase 2, but the number of children engaged in outdoor play dropped from 115 in phase 1 to 95 in phase 2. The proportion of children engaged in sedentary activities during outdoor play remained roughly the same, from 27.8% to 26.3%, but vigorous activity decreased from 23.5% to 16.84%. In Lockeport, the number of children observed in AT decreased from 512 in phase 1 to 354 in phase 2, and the number of children engaged in outdoor play decreased from 148 in phase 1 to 33 in phase 2. However, the intensity of children's outdoor play increased, with the proportion of sedentary activities decreasing from 52% to 30% and vigorous activity increasing from 25% to 52%. In Yarmouth, there was an increase in the number of children observed engaging in AT from 213 in

phase 1 to 253 in phase 2, but a slight decrease in outdoor play from 13 children in phase 1 to 11 in phase 2. The intensity of children's outdoor play also increased, with the proportion of sedentary activities decreasing from 61.5% to 27.3% and vigorous activity increasing from 15.4% to 27.3%.

Hypothesis 2. suggested that at phase 1, girls would have lower engagement in AT and outdoor play compared to boys, but by phase 2, the engagement levels of girls and boys would be more comparable. The data did not support this hypothesis in Antigonish and Lockeport and partially supported it in Yarmouth. In Antigonish, at phase 1, girls had slightly higher engagement in AT than boys (42.9% boys vs. 44.6% girls), but by phase 2, boys' engagement in AT increased to 49.2% while girls' engagement decreased to 34.9%. For outdoor play in Antigonish, girls had higher engagement than boys at phase 1 (56.5% girls vs. 43.5% boys), but at phase 2, boys had higher engagement than girls (36.8% girls vs. 63.2% boys). In Lockeport, at phase 1, boys had lower AT engagement compared to girls (46.5% boys vs. 52.1% girls), but by phase 2, boys increased their AT engagement while girls' engagement decreased (55.7% boys vs. 43.5% girls). Similarly, boys had lower engagement in outdoor play compared to girls in phase 1 (32.4% boys vs. 67.6% girls), but this reversed at phase 2 (57.6% boys vs. 42.4% girls). In Yarmouth, at phase 1, girls had slightly lower AT engagement than boys (50.2% boys vs. 48.8% girls), but by phase 2, AT levels became less comparable (56.9% boys vs. 37.2% girls). For outdoor play, girls had lower engagement compared to boys at phase 1 (69.2% boys vs. 30.8% girls), but at phase 2, the levels of engagement were more comparable (45.5% boys vs. 54.5% girls).

Hypothesis 3. predicted a larger proportion change in girls' levels of AT and outdoor play from phase 1 to phase 2 compared to boys. This hypothesis was not supported in any of the

communities, as girls' engagement in AT and outdoor play generally decreased, except for a positive increase in girls' outdoor play in Yarmouth. In Antigonish, boys' engagement in AT increased by 6.3 percent (from 42.9% to 49.2%), while girls' engagement decreased by 9.7 percent (from 44.6% to 34.9%). Boys' engagement in outdoor play increased by 19.7 percent (from 43.5% to 63.2%), while girls' engagement decreased by 19.7 percent (from 56.5% to 36.8%). In Lockeport, boys' engagement in AT increased by 9.2 percent (from 46.5% to 55.7%), compared to an 8.6 percent decrease for girls (from 52.1% to 43.5%). Boys' engagement in outdoor play increased by 35.2 percent (from 32.4% to 67.6%), while girls' engagement decreased by 35.2 percent (from 57.6% to 42.4%). In Yarmouth, boys' engagement in AT increased by 6.7 percent (from 50.2% to 56.9%), while girls' engagement decreased by 11.6 percent (from 48.8% to 37.2%). Boys' engagement in outdoor play decreased by 23.7 percent (from 69.2% to 45.5%), while girls' engagement increased by 23.7 percent (from 30.8% to 54.5%). These findings indicate that boys experienced a more significant increase in engagement levels than girls across all communities, contrary to the hypothesis.

In summary, hypothesis 1 was partially supported in Antigonish and Lockeport, while hypotheses 2 and 3 were not supported. In Yarmouth, hypotheses 1 and 2 were partially supported, but hypothesis 3 was not supported. This indicates that some positive differences in children's AT and outdoor play were observed following built and social environment interventions, though findings varied across community settings and genders. Additionally, breaking down the data by count sites in each community reveals that certain sites observed significantly more children than others. For example, in Antigonish, most children were observed at the SS and AT count sites, compared to the BR and MC sites. It was also noted that colder weather during the phase 2 data collection periods could have influenced the results, as

compared to phase 1. Other differences between phase 1 and 2 quantitative data collection include changes in infrastructure quality across communities, and contextual differences in Lockeport, where a community event took place at one count and park location during the phase 1 weekend day count, whereas no events or programs occurred during phase 2.

Document review was also performed on CoM planning and reporting tools, completed during phases 1 and 2 by the MPAL's of Antigonish, Lockeport, and Yarmouth. This showed that various built and social environment interventions were implemented to enhance community connectivity, increase opportunities for AT and outdoor play, and promote knowledge and awareness of simple movement within all three CoM communities. However, it was noted that none of these interventions involved children in the design process.

In Antigonish, built environment interventions included the development of multi-use pathways and a roundabout, the installation of bike racks, and the provision of grants to community hubs for enhancing outdoor spaces. Activities funded by these grants included trail and outdoor rink maintenance, disc golf gear, and playboxes. Social environment interventions in Antigonish included training movement leaders and organizing community events to encourage AT and active play, such as the MYM launch event. Additionally, Antigonish provided free or subsidized movement opportunities to community members, including free skates and swims at the local arena and pool, as well as an equipment loan program.

In Lockeport, built environment interventions included improving walking routes through the addition of benches, signage, AT pathways, and concrete pathway connectors, as well as the installation of a permanent community playbox. Lockeport enhanced social environments by promoting movement through leadership training, community events, bike programs, marketing, and developing a community inventory of outdoor spaces.

Yarmouth's built environment interventions focused on creating new walking and cycling routes, adding sidewalks, supporting a splash park, and purchasing a community playbox. Social environment interventions in Yarmouth included training movement leaders, launching community walks and wellness challenges, supporting a child peer mentoring walking program, and organizing play programs and events for families.

The built and social environment interventions within all three communities were implemented at various timepoints within phases 1 and 2 and at various geographic locations. However, most interventions were completed between the phase 1 and 2 quantitative data collection periods (Fall 2022 to Fall 2023). Notable exemptions include Antigonish, where construction on the multi-use pathways and roundabout was still ongoing during the phase 2 data collection, although the pathways were usable during the collection periods. The geographic locations of interventions were dispersed across each community. Nonetheless, most interventions occurred at or near count locations, suggesting that changes in movement behaviours in communities would likely be reflected in quantitative data collection. For example, the multi-use pathway and roundabout in Antigonish was installed at the SS count location.

Lastly, content analysis was performed on focus group transcripts and participant demographic questionnaires. The in-person focus group provided valuable insights into one notable CoM community, the County of Antigonish. A total of 11 CoM leadership team members and 5 children (ages 13-18 years) participated in the focus group, with participants residing across Antigonish County, including both urban and rural areas. All participants self-reported their ethnicity as white, and nine participants identified their gender as female while seven identified as male.

Focus group discussions revealed various socioecological factors that influence children's engagement in AT and outdoor play. Individual-level factors discussed included age, gender, ethnicity, attitudes and motivations of both children and parents, and knowledge and skills. While positive attitudes towards AT and outdoor play were noted, attitudes and perceptions varied across age and gender. For example, younger children were more inclined to engage in AT and outdoor play than older children. However, parents were less likely to allow younger children to engage in these activities unsupervised, particularly biking. Additionally, girls were perceived to engage in less active play than boys. Participants also noted that weather and time constraints significantly influenced children's engagement in AT and outdoor play.

Social environment factors discussed included social norms (e.g., gender stereotypes), culture, social and parental support, role modeling (e.g., teachers, parents, peers), perceptions of safety, and the availability of structured and unstructured physical activity programming. Social norms and culture, parental support, and perceptions of safety were identified as critical determinants of children's participation in AT and outdoor play. Participants also highlighted the need for more unstructured opportunities for children to engage in AT and play, allowing for spontaneous and self-directed physical activity.

Built environment factors discussed included AT infrastructure (e.g., separated sidewalks, bike lanes, multi-use pathways), signage, lighting, availability and accessibility of outdoor play spaces, traffic calming measures (e.g., speed limits, roundabouts, traffic volume), and the connectivity and proximity of AT and outdoor play spaces to amenities and key settings. Participants emphasized that safe, well-connected environments supportive of AT and outdoor play are essential to promote children's engagement in healthy movement behaviours.

Policy environment factors included discussions on municipal AT policies and action plans, as well as the enforcement of laws (e.g., speed limits). Participants highlighted the need for supportive municipal policies for AT to strengthen ongoing work within Antigonish for more movement and to overcome a car-centric culture.

5.2 Interpretation and Integration of Findings

Prior research using a socioecological framework has emphasized the role of built and social environments in influencing children's engagement in healthy movement behaviours, including AT and outdoor play (Mitra & Manaugh, 2020; Rhodes et al., 2019). However, limited studies have produced quality evidence of the impact of built and social environment interventions on children's AT and outdoor play, and gendered differences in intervention impact are relatively unknown (Larouche & Ghekiere, 2018; Smith et al., 2017; Timperio et al., 2015). The impact of population-level environmental interventions aiming to promote movement are dependent on the unique contexts and characteristics of settings in which they take place, therefore it is essential to use comprehensive approaches when evaluating impact (Creswell, 2013; Zhang et al., 2022). To the author's knowledge no prior mixed methods studies have examined the impact of built and social environment interventions within Nova Scotian communities with a specific focus on children's AT and outdoor play. Therefore, this study aimed to address this gap in the existing literature. The study findings highlight the challenges of evaluating population-level interventions and reveal the complex interactions between children's built and social environments and their engagement in AT and outdoor play. By integrating quantitative and qualitative data, several insights emerge on how these interventions impact children's movement behaviours.

Quantitative Findings. showed variations in children's engagement in AT and outdoor play across different community settings and genders. For instance, while some communities like Antigonish and Yarmouth saw an increase in children's AT from phase 1 to phase 2, Lockeport experienced a decrease. Additionally, the intensity of outdoor play increased in some cases, even if the overall number of children engaging in outdoor play decreased. These changes suggest that while fewer children might have been engaging in play in outdoor settings, those who did were more vigorously active. This variability of findings across communities highlights the context-specific nature of environmental interventions, as differences in impact were observed despite the similarity of community interventions. Additionally, findings were variable within communities. Some count sites and park sub-areas observed far greater numbers of children than others. Differences in weather conditions and infrastructure quality between phase 1 and phase 2 data collection periods may have influenced these findings. Colder weather during phase 2 could have reduced outdoor activity levels, while ongoing or incomplete infrastructure projects might have limited the effectiveness of built environment enhancements during the data collection period. These findings are consistent with existing literature that suggests built and social environment factors can influence children's healthy movement behaviours and physical activity (Dollman, 2018; Wang et al., 2023).

Qualitative Findings. further explain the determinants of children's AT and outdoor play. Built environment enhancements, such as the development of multi-use pathways, bike lanes, and play spaces, along with social environment enhancements such as leadership training, marketing, and programming, were implemented across the community settings during phases 1 and 2 of CoM. Notably, children's voices were not included in the design of these interventions. A focus group revealed individual-level factors, including gender, age, attitudes, skills, and

motivations, significantly influence children's movement behaviours in Antigonish. For example, younger children were more inclined to engage in AT and outdoor play, but parental concerns about safety often restricted their unsupervised participation, particularly in activities like biking. Gender differences were also evident, with boys generally more engaged in vigorous outdoor play compared to girls. Social environment factors, such as social norms, culture, parental support, perceptions of safety, and availability of structured and unstructured physical activity programming, influenced children's perceptions, access, engagement of AT and outdoor play. Previous research supports these findings, indicating that perceptions of safety and parental attitudes are critical factors influencing children's outdoor play and AT (Lee et al., 2021; Loebach & Gilliland, 2022; Wilson et al., 2018). Built environment factors discussed included AT infrastructure (e.g., separated sidewalks, bike lanes, multi-use pathways), signage, lighting, availability and accessibility of outdoor play spaces, traffic calming measures (e.g., speed limits, roundabouts, traffic volume), and the connectivity and proximity of AT and outdoor play spaces to amenities and key settings. The qualitative data underscored the importance of safe, supportive built and social environments that encourage spontaneous and self-directed AT and outdoor play, which is often facilitated by role models and community support systems. These findings align with existing literature that highlights the significance of environmental and social contexts in shaping physical activity behaviours among children (Loebach & Gilliland, 2022; Ståhl et al., 2001).

Integrated Findings. highlights several overarching themes. Safe and well-connected built environments that support AT are essential for promoting children's movement behaviours. However, these built environments must be complemented by supportive social environments. For instance, community perceptions of safety and parental support play crucial roles in

determining whether children can freely engage in AT and outdoor play. This aligns with previous studies that have shown multicomponent interventions are most effective for changing movement behaviours (Laverack, 2017; Young et al., 2020).

The findings also suggest that shifting away from a car-centric culture requires long-term efforts and multifaceted approaches. Built environment enhancements alone are not sufficient; they must be part of broader population level strategies that include social engagement, and supportive policies. The interaction between built and social environments is evident, as infrastructure improvements need to be concurrent with efforts to change social norms and behaviours. This holistic approach is supported by the socioecological model, which emphasizes the interaction between individual, social, and environmental factors in influencing healthy movement behaviours (Mitra & Manaugh, 2020; Rhodes et al., 2019).

Finally, the findings highlight the complex nature of evaluating population level environmental interventions as external factors such as weather may have moderated the study's findings. For instance, colder weather during phase 2 likely lessen outdoor activity levels, indicating the need for weather-appropriate infrastructure and programming to sustain children's engagement in AT and outdoor play year-round. This is supported by prior research indicating that seasonal variations can impact children's physical activity levels (Atkin et al., 2016).

In summary, the integrated findings underscore the importance of comprehensive approaches that combine built and social environment enhancements to effectively promote children's AT and outdoor play. While built environment changes are crucial, their success is heavily dependent on supportive social environments and long-term cultural shifts away from car dependence. However, longer-term evaluations and studies are required to determine the full

extent of the impact of environment interventions on children's healthy movement behaviours as changing behaviours is a complex and gradual process (Public Health Agency of Canada, 2023).

5.3 Strengths and Limitations

This study has several strengths that enhance its reliability and validity. One key strength is the repeated assessment of children's AT and outdoor play before and after environmental interventions. By comparing differences at multiple timepoints, the study provides valuable insights into the effectiveness of these interventions, offering a clearer picture of their impact. Repeat cross-sectional studies are particularly beneficial as they allow for the observation of population changes and trends over time, providing insights into the sustainability of interventions (Rafferty et al., 2015).

The integration of quantitative and qualitative findings further strengthens the study, offering a more comprehensive understanding of the intervention impacts. Extending data collection methods beyond a solely quantitative or qualitative approach allows for better contextualization of what is happening as a result of built and social environment interventions. This is especially advantageous given the limited and often low-quality evidence available within the existing literature for population-level movement interventions. By triangulating data from different sources, such as pedestrian and cycling counts, SOPARC observations, document reviews, and focus group discussions, this study enhances the quality of findings to capture a clearer picture of children's behaviours and experiences.

For instance, the study's quantitative findings differed from the initial hypotheses, but integrating results from the document review and focus groups helped to elucidate factors that may have contributed to these unexpected outcomes. One such factor was the poor weather during the T2 count observations, which likely reduced the number of children observed

engaging in AT and outdoor play. Additionally, focus group discussions highlighted the challenges posed by a pervasive car-centric culture, emphasizing the need for long-term evaluations and tailored interventions to overcome social barriers. While causation cannot be established from this study due to its non-randomized design, the focus group provided valuable insights by capturing children's firsthand experiences and attitudes, which attributed some of the positive changes in AT and outdoor play to recent built and social environment interventions within their community. Overall, this mixed methods approach enhances the depth of the study findings, providing a richer and more nuanced understanding of the topics of research (Creswell, 2013).

Including children's voices in the research process is another significant strength. Engaging children directly offers deeper insights into their experiences and perceptions regarding AT and outdoor play, ensuring that the findings are relative of their experiences and perceptions. However, since only five children were included in this study, the generalizability of these findings to a larger population of children is cautioned. Children's perspectives are crucial for developing interventions that are responsive to their needs and preferences, thereby increasing the likelihood of success (Loebach & Gilliland, 2022).

Furthermore, the study considers the determinants of children's AT and outdoor play across various sociodemographic and geographic contexts. This approach enhances the findings with a better understanding of how different community factors interact and influence behaviour. By examining variables such as gender, the study provides a detailed picture of the complex interplay of socioecological influences on children's healthy movement behaviours (Riazi et al., 2021; Salvo et al., 2021).

However, the study also has several limitations that should be acknowledged. As alluded to above, the temporal scale of the intervention impact poses a significant challenge.

Environmental changes often require a longer follow-up period to capture their full effects, as immediate impacts may not be visible (Bauman et al., 2012; Lee et al., 2021; Smith et al., 2017). Longitudinal follow-up beyond the current study period could provide stronger evidence of the interventions' effectiveness. Additionally, there was limited control over the timing of these interventions, such as infrastructure changes, within the study settings. This lack of control can complicate the analysis, as interventions may not align properly with the study's data collection periods.

The subjectivity involved in counters perceiving age and gender may introduce potential biases in the data. Human error or subjective perceptions can affect the accuracy and reliability of gender data, potentially skewing the results. For example, during observations some children were marked as having an 'indiscernible' gender if their gender could not easily be identified by counters as 'girl' or 'boy' due to clothing, body posture, or other factors that made identification unclear. This category did not represent gender-diverse or gender non-conforming individuals. Across all study communities, the percentage of total children marked as gender indiscernible during a given timepoint was as low as 0.8% to as high as 15.9%. Thus, it is very likely the results had inaccuracies regarding gender representation. Moreover, the lack of representation of gender-diverse identities limits the inclusiveness of the findings, potentially overlooking the experiences of non-binary and gender-nonconforming children. Inclusive data collection methods are essential for representing all groups properly (Westbrook & Saperstein, 2015).

There is also a possibility of participant reactivity effects during observational counts, where the presence of observers might influence children's behaviour, leading to changes in their

usual activities. Reactivity can decrease the validity and reliability of data, making it less reflective of children's typical behaviour patterns (Sallis, 2010).

Additionally, various moderating variables like weather conditions, ongoing construction, and community events may have impacted the results. For instance, colder weather during the phase 2 data collection periods could have discouraged outdoor play, while community events during phase 1 might have inflated the weekend day counts in Lockeport. These external factors can introduce errors into the data that can obscure the true effects of the interventions, highlighting the need for considering such variables in future research designs (Skelly et al., 2012).

Lastly, the findings from this study may not be generalizable to wider populations due to the specific contexts, participants, and settings included. The unique characteristics of the communities studied, such as their size, demographics, geographic location, and, existing infrastructure, may limit the applicability of the results to other settings. While the findings provide valuable insights for the community's understudy, caution should be exercised when applying these findings to broader contexts. Generalizability is a common challenge in research focused on specific populations or contexts, underscoring the importance of replicating study methods to validate findings (Rashid et al., 2019).

5.4 Significance and Implications for Future Research and Practice

This study addresses significant gaps in the literature concerning the impacts of built and social environment interventions on children's healthy movement behaviours in Nova Scotia. By providing evidence on how these interventions influence AT and outdoor play among children, the research contributes to a deeper understanding of the determinants and contexts that act as facilitators or barriers to these behaviours. The findings have practical implications for the

evaluation of CoM evaluation and MYM initiatives as they can inform community reports, highlighting current trends in children's movement and areas for improvement.

Moreover, the insights gained from this study can help shape policies and action plans under the Let's Get Moving Nova Scotia initiative. By demonstrating the importance of combined built and social environment interventions, the research supports the development of comprehensive strategies to promote daily movement among children. This, in turn, can enhance opportunities for children in Nova Scotia to engage in healthy movement behaviours, ensuring that interventions are inclusive and address the diverse needs of all children, including those from different sociodemographic backgrounds. Ultimately, the study's findings underscore the importance of supportive environments in fostering children's lifelong health and well-being.

5.5 Recommendations and Future Directions

Health promoters should design future movement interventions that address multiple socioecological factors, including built, social, and policy elements, to promote children's healthy movement behaviours. Incorporating children's voices and perspectives into the design and implementation of these interventions is crucial, as it ensures that the initiatives are responsive to their needs and preferences. Engaging children directly can lead to more effective and sustainable outcomes.

Future studies and evaluations should investigate the impact of environmental interventions over longer periods, employing longitudinal and pre/post intervention designs to capture changes in movement behaviours. Assessing differences in impact across different sociodemographic dimensions, including gender, is essential to understand the effects of interventions and to tailor strategies appropriately. In examining gender, it is recommended to select methods that are inclusive of gender-diverse individuals.

Additionally, future health promotion interventions, studies, and evaluations should consider the unique contexts and characteristics of the target populations and settings. Recognizing the specific needs of communities will enhance the relevance and effectiveness of the interventions. Health promotion policy and practice should focus on creating safe and supportive built and social environments that facilitate unstructured AT and outdoor play across various community settings. By adopting a holistic approach, future efforts can better promote and sustain healthy movement behaviours among children.

5.6 Conclusion

Interventions targeting both built and social environments resulted in some increases in children's AT and outdoor play. However, the outcomes of these interventions were relatively inconclusive as there was high variability across different community settings and between genders. Nonetheless, findings suggest that ensuring AT infrastructure is safe, well-connected, and accessible, alongside providing adequate outdoor play spaces and implementing traffic-safety measures, is fundamental for encouraging children to engage in healthy movement behaviours. Additionally, social factors at the family and community levels play a significant role in how the built environment is accessed and utilized, affecting children's participation in AT and outdoor play.

The findings highlight the need for further research to better understand the multitude of influences on children's movement behaviours, with a particular emphasis on the differences observed across genders. This will help in tailoring interventions that are more effective and inclusive. Importantly, incorporating children's voices and perspectives into health promotion research, policy, and practice can lead to the development of environments that not only support children's healthy movement behaviours but also contribute to creating more equitable

communities and cities. By doing so, we can ensure that the built environment is designed in a way that meets the needs of all children, fostering their daily movement and overall health and well-being.

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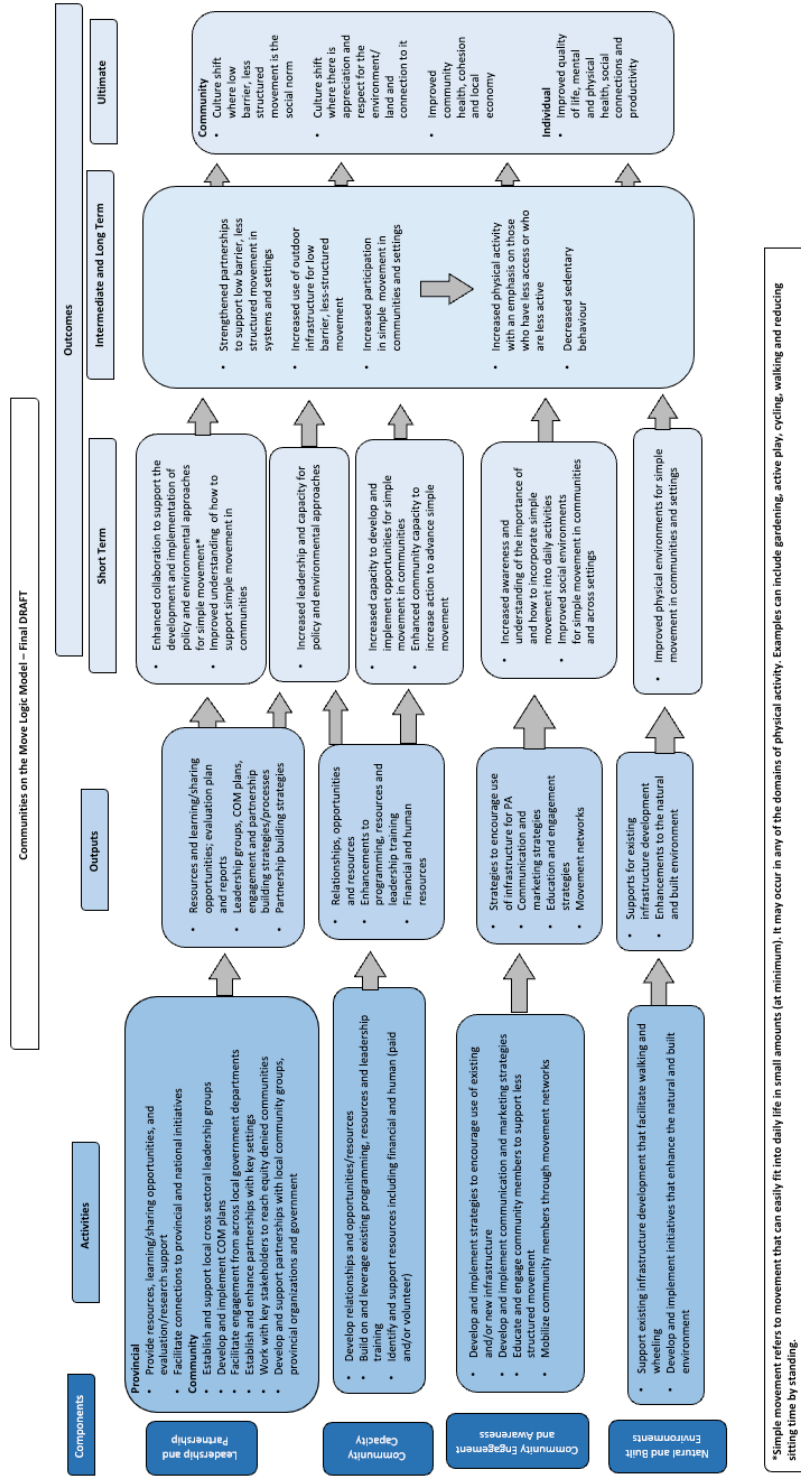
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APPENDIX A: OVERVIEW OF STUDY PHASES, PROCEDURES, AND PRODUCTS

Phase	Procedure	Product
Quantitative Data Collection (Secondary)	<ul style="list-style-type: none"> • Observational counts of children’s engagement in AT and outdoor play at three community settings (collected as part of the CoM evaluation) • Measures collected T1 (Fall 2022) and T2 (Fall 2023) 	<ul style="list-style-type: none"> • Numeric data
Quantitative Data Analysis (Secondary)	<ul style="list-style-type: none"> • Descriptive analysis <ul style="list-style-type: none"> ○ Frequency of children’s AT use and mode with gender-specific subtotals at T1 and T2 ○ Frequency of children’s park use with gender-specific subtotals at T1 and T2 ○ Totals of children’s intensity of outdoor play with gender-specific subtotals at T1 and T2 	<ul style="list-style-type: none"> • Descriptive statistics
Connecting Quantitative and Qualitative Phase	<ul style="list-style-type: none"> • Identify results for follow-up • Inform development of focus group questions/prompts 	<ul style="list-style-type: none"> • Focus group protocol
Qualitative Data Collection (Secondary) (Primary)	<ul style="list-style-type: none"> • Document review of CoM planning and reporting tools from all three community settings (collected as part of the CoM evaluation) • Focus groups with leaders and children from one community setting 	<ul style="list-style-type: none"> • Textual data
Qualitative Data Analysis	<ul style="list-style-type: none"> • Content Analysis <ul style="list-style-type: none"> ○ Coding and sub-coding 	<ul style="list-style-type: none"> • List of quotes, codes, sub-codes, and themes
Integration of Quantitative and Qualitative Findings	<ul style="list-style-type: none"> • Integration and interpretation of quantitative and qualitative findings 	<ul style="list-style-type: none"> • Integrated discussion

APPENDIX B: COM LOGIC MODEL



*Simple movement refers to movement that can easily fit into daily life in small amounts (at minimum). It may occur in any of the domains of physical activity. Examples can include gardening, active play, cycling, walking and reducing sitting time by standing.

APPENDIX C: MAP OF COM COMMUNITIES



APPENDIX D: COUNT OBSERVATION FORM

Counter ID:
Location:
End Time:

Date:
Weather:
Start Time:

MODE	GENDER			ETHNICITY							TOTAL	
	Male	Female	Indiscernible	White	Black	Middle Eastern	Asian	South Asian	Indigenous	Latino		Indiscernible
Child Passenger												
Adult Passenger												
Older Adult Passenger												
Child Scooting (manual)												
Child Roller Blading												
Child on a Bike												
Adult on a Bike												
Older Adult on a Bike												
Child Walking												
Adult Walking												
Older Adult Walking												
Child Running												
Adult Running												
Older Adult Running												
Wheelchair (Manual)												
Wheelchair (Electric) or Motorized Scooter												
Walking with Mobility Aid												
Person with Notable Visual Impairment												
Dog (accompanied by owner)												

APPENDIX E: SOPARC OBSERVATION FORM

This is a reliability check

DATE _____ PARK NAME _____ OBSERVER _____ PERIOD: AM LUNCH AFTERNOON EVENING
 TARGET AREA 3 Subtarget Area # of Total Subtarget areas _____ START TIME 3:36

CONDITIONS OF TARGET AREA
 Accessible (e.g., not locked or rented to others) Yes No Dark (e.g., insufficiently lit) Yes No
 Usable (e.g., is not excessively wet or windy) Yes No Empty (i.e., area not occupied) Yes No
 Equipped (e.g., removable balls available) Yes No
 Supervised (i.e., by official personnel) Yes No
 Organized (e.g., team sporting event) Yes No

Comments: _____

PEOPLE	ACTIVITY	AGE GROUP			ETHNICITY				ACTIVITY LEVEL				
		Child	Teen	Adult	Senior	L	B	W	O	S	W	V	
Participants	Primary Activity												
Female	Soccer	4				2	1	1				2	2
Male	Soccer	6		2		5		3			3	3	2
Participants	Secondary Activity												
Female	Cheerleading	10		1		11					6	4	1
Male	none												
Spectators	Organized Activity												
Female	None												
Male	None												

Fitness Related Codes:
 aerobics (dance/stop aerobics)
 fitness stations
 jogging/running
 strengthening exercises (pull ups)
 walking

Sport Related Codes:
 baseball
 basketball
 cheer leading
 dance
 football
 gymnastics

Active Game Related Codes:
 climbing/sliding
 jumping (rope, hop scotch)
 manipulatives/racquet
 tag/chasing games
 active play

Sedentary Related Codes:
 chess/checkers/cards
 lying down
 picnic (food involved)
 reading
 standing
 sitting

Note. Sample SOPARC observation form (McKenzie et al., 2006). Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2957838/>

APPENDIX F: STUDY RECRUITMENT POSTER

Impact of Built and Social Environment Interventions on Children's Active Transportation in Nova Scotia



Participate in
our research
study!

WE WANT TO ASK YOU ABOUT:

- How you currently engage in physical activity in your community
- What helps you or prevents you from moving about your community
- If there have been any recent changes that have helped you or prevented you from moving about your community.
- If you have any suggestions of how we can help children and youth to be more active in your community.

YOU WILL BE ASKED TO:

- Give your consent to participate in the study.
- Participate in a focus group or interview (online or in-person, approximately 60 to 90 minutes).

TO BE ELIGIBLE:

- **Adult:** You must be 18 years of age or older and have knowledge/experience implementing built and/or social environment interventions aimed at promoting AT within the County of Antigonish. Must be living or working in the County of Antigonish for at least one year prior to the study.
- **Youth:** You must be between the ages of 14-17 years old and living in the County of Antigonish for at least one year prior to the study.
- **Both:** You must have sufficient English fluency to participate in the focus group interview.

For more information or if you are interested in participating in this study please contact EmilyB@dal.ca



APPENDIX G: STUDY INFORMATION SHEET

Impact of Built and Social Environment Interventions on Children's Active Transportation and Outdoor Play in Nova Scotia

I would like to invite you to take part in a research study. Before you decide, you need to understand why the research is being done, and what it would involve on your behalf. Please take time to review the following information carefully. Do not hesitate to ask questions if anything is not clear or if you would like more information.

Introduction

My name is Emily Burke. I am a second-year master's student at Dalhousie University in their graduate-level Health Promotion Program. I am kindly requesting participation in a research study that I am conducting titled: *Impact of Built and Social Environment Interventions on Children's Active Transportation and Outdoor Play in Nova Scotia (NS)*. This study aims to understand community and child perspectives of built and social environment interventions in NS, to support children's engagement in healthy movement.

Explanation of Procedures

This study involves the participation of children (14-18 years old) and adult community members who are living in Antigonish County, the Town of Lockeport, or the Municipality of the District of Yarmouth. Participants will take part in a focus group with individuals from their community that is facilitated by the primary researcher. Interviews will be conducted either in the community of the participant's residence, in a private space, or online via a secure video/teleconference platform (i.e., Microsoft Teams). Each focus group will be approximately 60-90 minutes and will be relatively informal. All focus groups will be audio-recorded for the purpose of data collection and analysis. The primary researcher will take field notes during the focus group process. Participation is completely voluntary, and you may withdraw at any time without consequence, up until 2 weeks after your focus group. You have the right to refuse to answer any question you may be asked during this study.

Confidentiality

The information gathered during this study will remain confidential in secure premises during the entire duration of this project. All identifying information will be kept by the primary researcher and not disclosed to anyone besides the research team. There will be no identifying information released as it will all be coded in the final report. Signed consent forms and original audio recordings will be stored safely until the completion of the study. All data will be destroyed 7 years following the completion of this study. The results of this research will be published as a research paper, and infographics, and potentially in a professional journal or presented at professional meetings.

Risks and Discomforts

Participating in this study carries minimal anticipated risks or discomforts. However, it's important to acknowledge potential privacy and confidentiality concerns associated with

focus groups. While efforts will be made to create a supportive environment, participants may experience psychological distress or emotional feelings, such as sadness, when responding to questions asked during the interview. It is crucial to note that maintaining the privacy and confidentiality of participants is a priority, and steps will be taken to minimize the risk of any unintended disclosure of personal information during the focus group discussions.

Benefits

A direct benefit you will receive for your participation in this study is a gesture of appreciation for your time in the form of a \$25 e-gift (or physical gift card if e-gift is not possible). In addition, the following indirect benefits may be experienced. These include the opportunity to discuss feelings, perceptions, barriers, and facilitators as it relates to physical activity and other health-promoting behaviours of children living in Nova Scotia. Participation may contribute to the development and implementation of culturally informed physical activity and active transportation interventions that promote health and equity.

Further Information

You are welcome to ask the researcher any questions at any time, including any that may occur during the interview. If you have any questions once the interview is complete, you may contact the researcher or their supervisor using the information provided below.

Researcher Contact Information

Emily Burke, MA Health Promotion Candidate
EmilyB@dal.ca

Faculty Supervisor Contact Information

Dr. Sarah A. Moore, Ph.D.
Sarah.Moore@dal.ca

APPENDIX H: COM PLANNING AND REPORTING TOOL TEMPLATE

Communities on the Move Planning and Reporting Template

Planning

MPAL Outcome: Social supports for walking						
For example, community mobilization of volunteers to create social networks that support walking or leveraging campaigns to impact social norms regarding walking.						
Title of Initiative(s) Related to this Outcome						
Initiative 1						
Initiative 2						
Initiative 3						
Initiative 4						
Initiative 5						
Planning						
Overview of Initiative(s)						
Initiative 1						
Initiative 2						
Initiative 3						
Initiative 4						
Initiative 5						
Physical Activity Strategy Goal(s) Addressed						
Initiative 1						
Initiative 2						
Initiative 3						
Initiative 4						
Initiative 5						
Initiative Objective(s)						
Initiative 1						
Initiative 2						
Initiative 3						
Initiative 4						
Initiative 5						
	Main Setting	Main Target Group	Other Groups Impacted		Start Month	End Month
Initiative 1						
Initiative 2						
Initiative 3						
Initiative 4						
Initiative 5						
	Evaluation Indicators		Evaluation Data Sources		MPAL Role	
Initiative 1						
Initiative 2						

Initiative 3			
Initiative 4			
Initiative 5			

MPAL Outcome: Physical Environments for Walking
 For example, stairwell enhancements or building or improving trails, sidewalks and crosswalks.

Title of Initiative(s) Related to this Outcome

Initiative 1	
Initiative 2	
Initiative 3	
Initiative 4	
Initiative 5	

Planning

Overview of Initiative(s)

Initiative 1	
Initiative 2	
Initiative 3	
Initiative 4	
Initiative 5	

Physical Activity Strategy Goal(s) Addressed

Initiative 1	
Initiative 2	
Initiative 3	
Initiative 4	
Initiative 5	

Initiative Objective(s)

Initiative 1	
Initiative 2	
Initiative 3	
Initiative 4	
Initiative 5	

	Main Setting	Main Target Group	Other Groups Impacted	Start Month	End Month
Initiative 1					
Initiative 2					
Initiative 3					
Initiative 4					
Initiative 5					

Evaluation Indicators **Evaluation Data Sources** **MPAL Role**

Initiative 1			
Initiative 2			
Initiative 3			

Initiative 4			
Initiative 5			

MPAL Outcome: Social supports for other less structured physical activity
 For example, community mobilization of volunteers to create social networks that support movement that can easily be incorporated into daily life (e.g. cycling, active play) and leveraging campaigns to impact social norms.

Title of Initiative(s) Related to this Outcome

Initiative 1	
Initiative 2	
Initiative 3	
Initiative 4	
Initiative 5	

Planning

Overview of Initiative(s)

Initiative 1	
Initiative 2	
Initiative 3	
Initiative 4	
Initiative 5	

Physical Activity Strategy Goal(s) Addressed

Initiative 1	
Initiative 2	
Initiative 3	
Initiative 4	
Initiative 5	

Initiative Objective(s)

Initiative 1	
Initiative 2	
Initiative 3	
Initiative 4	
Initiative 5	

	Main Setting	Main Target Group	Other Groups Impacted	Start Month	End Month
Initiative 1					
Initiative 2					
Initiative 3					
Initiative 4					
Initiative 5					

	Evaluation Indicators	Evaluation Data Sources	MPAL Role
Initiative 1			
Initiative 2			
Initiative 3			
Initiative 4			

Initiative 5		
--------------	--	--

MPAL Outcome: Physical environments for other less structured physical activity
 For example, changes to the natural and man-made environment that support movement that can easily be incorporated into daily life (e.g. play boxes, community gardens, painted games and bike lanes).

Title of Initiative(s) Related to this Outcome

Initiative 1	
Initiative 2	
Initiative 3	
Initiative 4	
Initiative 5	

Planning

Overview of Initiative(s)

Initiative 1	
Initiative 2	
Initiative 3	
Initiative 4	
Initiative 5	

Physical Activity Strategy Goal(s) Addressed

Initiative 1	
Initiative 2	
Initiative 3	
Initiative 4	
Initiative 5	

Initiative Objective(s)

Initiative 1	
Initiative 2	
Initiative 3	
Initiative 4	
Initiative 5	

	Main Setting	Main Target Group	Other Groups Impacted	Start Month	End Month
Initiative 1					
Initiative 2					
Initiative 3					
Initiative 4					
Initiative 5					

	Evaluation Indicators	Evaluation Data Sources	MPAL Role
Initiative 1			
Initiative 2			
Initiative 3			
Initiative 4			
Initiative 5			

MPAL Outcome: Policy to support physical activity
 For example, written policies to encourage movement through recreation access, walking meetings and active transportation.

Title of Initiative(s) Related to this Outcome

Initiative 1	
Initiative 2	
Initiative 3	
Initiative 4	
Initiative 5	

Planning

Overview of Initiative(s)

Initiative 1	
Initiative 2	
Initiative 3	
Initiative 4	
Initiative 5	

Physical Activity Strategy Goal(s) Addressed

Initiative 1	
Initiative 2	
Initiative 3	
Initiative 4	
Initiative 5	

Initiative Objective(s)

Initiative 1	
Initiative 2	
Initiative 3	
Initiative 4	
Initiative 5	

	Main Setting	Main Target Group	Other Groups Impacted	Start Month	End Month
Initiative 1					
Initiative 2					
Initiative 3					
Initiative 4					
Initiative 5					

	Evaluation Indicators	Evaluation Data Sources	MPAL Role
Initiative 1			
Initiative 2			
Initiative 3			
Initiative 4			
Initiative 5			

Reporting On the Work/Initiatives

Reporting				
	Evaluation Indicators (Auto-populated based on planning)	Results and Learnings	Partnerships and Resources (government, community organizations). Who was involved (name of organization, staff position)? How did you engage and work with them (e.g., shared information, coordinated an event, collaboratively planned and shared resources)? What or how did they contribute?	Equity Denied Groups If applicable, what actions were done to increase reach and support for equity denied groups?
Initiative 1				
Initiative 2				
Initiative 3				
Initiative 4				
Initiative 5				

Administration and Leadership – Planning and Reporting

Communities on the Move Administration and Leadership		
	Planned	Completed
Local Leadership Team	What actions should be planned to support your leadership team?	What actions were done to support your leadership team?
Local Leaders	What actions are planned to build knowledge and understanding among influencers and decision makers?	What actions were done to build knowledge and understanding among influencers and decision makers?
Local Stakeholder Engagement (e.g., relationship building and engagement related to CoM overall)	Are there specific actions to engage local stakeholders (internal and external) in this work?	What actions were taken to engage local stakeholders in this work?
Evaluation Support	Include key actions related to evaluation and data collection.	What actions were done related to evaluation and data collection?
Learning Opportunities	Remember to plan time to participate in Communities on the Move meetings and learning opportunities.	What learning opportunities did you participate in ?
Other		

APPENDIX I: PROTOCOL & FOCUS GROUP INTERVIEW GUIDE

Focus Group Interview Guide – County of Antigonish:

Note: The following are questions that are intended to serve as a framework for the focus group interview. The interview questions may change given the direction of the interview.

Interview Script (~ 60-90 minutes)

Introduction and Description of Research Purpose (~ 5 mins):

Hello, my name is Emily. I use the pronouns she, her, and hers. I will be interviewing you today. Thank you all for agreeing to participating in this focus group. The format of this focus group will be informal. I will be asking you a series of questions related to your views on the impact of built and social environment interventions on children's active transportation in your community to support and strengthen future interventions aimed at promoting children's healthy movement. For this study, active transportation refers to any human-powered movement, including walking, wheeling, and cycling.

First, we go through the consent form and hand out a demographic questionnaire. Then, we will encourage discussion through some guiding questions. As a reminder, this is a research study, and we would like to remind everyone about confidentiality. Everything that is shared in this focus group should be kept confidential, meaning no one should discuss what we say here outside of this meeting. Also, we want everyone to feel comfortable sharing information. As a group we want to create a safe space for sharing information and ensure everyone's voice is heard and valued. To do this, we encourage everyone to listen to others, allow others to speak, and be respectful to each other's opinions and stories. As a thank you for your time, you will be asked for your preferred e-gift card location (e.g., Amazon, Walmart, etc.) and this will be sent to you by email within 48 hours.

Go through consent form and reaffirm consent (~ 5mins):

Do you have any questions before we begin the interview? Yes No

Do you consent to participate in this interview? Yes No

And do I have your permission to audio-record this interview? Yes No

(Only if no) Do I have permission to take notes during this interview? Yes No

Do I have permission to use anything you say as a quote in any of the research reports or other types of knowledge translation materials (this may include conference presentations, infographics, and other such things)? And just as a reminder, you will not be personally identified in the quote.

Yes No

Demographic Questionnaire (~ 10min):

Now, I'm going to start off by asking you to complete a short questionnaire with demographic questions to help understand the diversity of individuals who are taking part in this study. Again, if you feel uncomfortable with any of these questions you can simply leave blank. Once you have completed this questionnaire, please hand it back to me. Your responses to this questionnaire will be de-identified and the information will not be shared with anyone outside of the research team.

Open ended questions to be included in questionnaire:

1. What is your name? Is this name how you would like for me to refer to you, or is there another name you would feel more comfortable with?
2. Also, which pronouns would you be most comfortable with me using to refer to you today?
3. How old are you?
4. What racial identity do you identify by?
5. What gender identity do you most identify with?
6. What city/town do you live in?
7. How long have you lived there?

Questions and Prompts (~ 30-60min):

Recently, built environment interventions (ex. Adding infrastructure such as sidewalks and bike lanes) and social environment interventions (ex. Programming such as walking groups and community cycling events) have been implemented across the County of Antigonish. Alongside this, an evaluation has been conducted to determine the impact of these interventions on children's engagement in active transportation. For example, how the number and characteristics of children walking, wheeling, and cycling at key locations across the County of Antigonish have changed. I have a summary of results from this evaluation outlining changes to children's active transportation from the Fall of 2022 to the Fall of 2023, which I will read to you shortly. To better understand factors contributing to these results, we wanted to hear your views and how they may or may not align with your experiences.

From the Fall of 2022 and the Fall of 2023, children's walking and wheeling has increased within the County of Antigonish

1. What built environment changes do you think have contributed to children's increased walking and wheeling?
2. What social environment changes do you think have contributed to children's increased walking and wheeling?
3. Did your own walking or wheeling habits increase between 2022 to 2023?
 - a. Why or why not?
4. What built environment changes do you think would further support children's walking and wheeling habits within the County of Antigonish?
5. What social environment changes do you think would further support children's walking and wheeling habits within the County of Antigonish?

From the Fall of 2022 and the Fall of 2023, children's cycling has increased within the County of Antigonish

1. What built environment changes do you think have contributed to children's increased cycling?
2. What social environment changes do you think have contributed to children's increased cycling?
3. Did your own cycling habits increase between 2022 to 2023?
 - a. Why or why not?
4. What built environment changes do you think would further support children's cycling habits within the County of Antigonish?
5. What social environment changes do you think would further support children's cycling habits within the County of Antigonish?

Closing (~10 mins)

1. Is there anything else that you would like to talk about that we didn't get the chance to cover today?

Thank you for taking the time to complete this interview today, and for your support with this study. We will be in touch regarding study findings and knowledge translation if you identified interest on the consent form.

APPENDIX J: PARTICIPANT CONSENT FORMS

CONSENT FORM (Adults)

Project title: Impact of Built and Social Environment Interventions on Children's Active Transportation and Outdoor Play in Nova Scotia

Lead researcher: Emily Burke

Affiliation: School of Health and Human Performance/Healthy Populations Institute, Dalhousie University

Email: EmilyB@dal.ca

Other researchers:

Dr. Sarah Moore (supervisor), School of Health and Human Performance/Healthy Populations Institute, Dalhousie University, Sarah.Moore@dal.ca

Dr. Sara Kirk, School of Health and Human Performance/Healthy Populations Institute, Dalhousie University, Sara.Kirk@dal.ca

Simran Bhamra, School of Health and Human Performance/Healthy Populations Institute, Dalhousie University, Simran.Bhamra@dal.ca

Funding provided by: Province of Nova Scotia – Department of Communities, Culture, Tourism, and Heritage

Introduction

We invite you to take part in a research study being conducted by Emily Burke, who is a student researcher at Dalhousie University. Choosing whether or not to take part in this research is entirely up to you. There will be no impact on your life if you decide not to participate in the research. The information below tells you about what is involved in the research, what you will be asked to do and about any benefit, risk, inconvenience or discomfort that you might experience. You should discuss any questions you have about this study with the lead researcher, Emily Burke. Questions can be asked by email whenever they come up.

Purpose of the Research Study

This study aims to understand community and child perspectives of built and social environment interventions in Nova Scotia, to support children's engagement in healthy movement.

Who Can Take Part in the Research Study

Children: Participants must be between the ages of 14-18 years old, and living in Antigonish County, the Town of Lockeport, or the Municipality of the District of Yarmouth for at least one year prior to the date of interview.

Adult: You may participate in this study if you are 19 years of age or older and have knowledge/experience implementing built and/or social environment interventions aimed at promoting children's movement in your community. Participants must be living or working in Antigonish County, the Town of Lockeport, or the Municipality of the District of Yarmouth for at

least one year prior to the date of the focus group. (The lead researcher will aim to recruit participants with different backgrounds and experiences to ensure each community is represented by a diverse array of voices and perspectives.)

All: You must all have sufficient English fluency to participate in the interview without the need of a translator.

What You Will Be Asked to Do

If you decide to participate in this research, all participants from your community (maximum 11) will be asked to attend one focus group in a private space within your community, or online via Microsoft Teams. The focus group will take approximately 1 hour to 1 ½ hours. During the focus group, you will be asked to answer questions regarding your perspectives on built and social environment interventions to promote children's movement within your community. This information will be used to help understand how to support children's movement across NS, as well as how to strengthen future interventions for children's healthy movement behaviours. The interviews will be audio-recorded and transcribed with all identifying information removed.

Possible Benefits, Risks and Discomforts

Benefits: No direct benefits are expected from participation, though the following indirect benefits may be experienced. This includes the opportunity to reduce the knowledge gap on methods for increasing engagement in movement among Nova Scotian children, as well as the sense of being seen and of having your thoughts and opinions heard. Participation may also contribute to the development and implementation of community specific interventions to increase movement.

Risks: There are minimal risks or discomforts anticipated from your participation in this study. Potential risks or discomfort may include possible psychological or emotional discomfort when asked questions during the interview. You will be offered breaks to minimize the risk of fatigue during the focus group.

Compensation / Reimbursement

To thank you for your time, we will give you a e-gift card or physical gift card worth \$25 after your participation in the interview.

How your information will be protected:

Privacy: Your participation in this research will be known only to the lead researcher and the other focus group participants from your community. Emphasizing the importance of privacy is essential to create a safe and open environment for participants to share their perspectives and experiences.

Confidentiality: The information that you provide will be kept confidential. Only the research team at Dalhousie University will have access to this information. The individuals involved in this study are bound by a strict obligation to maintain the confidentiality of all research-related data.

While we make every effort to safeguard your information, it's important to note that complete confidentiality cannot be guaranteed. Despite our best efforts, we cannot control the actions of

individuals outside the research team. We request that all participants respect the confidentiality of the discussions within the focus group; however, we cannot guarantee that everyone will adhere to this request.

All your identifying information (such as your name and contact information) will be kept by the lead researcher and securely stored separately from your research information. We will use a participant number (not your name) in our written and computer records so that the research information we have about you contains no names. During the study, all electronic records will be kept secure in an encrypted file on the researcher's password-protected computer. All paper records will be kept secure in a locked filing cabinet located in the researcher's office.

We will describe and share our findings from this study in a thesis, presentations, public media, infographics, and journal articles. We will only report group results and not individual results. This means that you will not be identified in any way in our reports.

Legal Obligations: We will not disclose any information about your participation except as required by law or our professional obligations. If you inform us about abuse or neglect of a child, we are required by law to contact authorities.

Data Retention: All data will be destroyed seven years following the completion of this study, and the students' submission of the final report.

If You Decide to Stop Participating

You are free to leave the study at any time and may do so by informing the interviewer of decision in-person or by email (at EmilyB@dal.ca). If you decide to stop participating during the study, you can decide whether you want any of the information that you have provided up to that point to be removed or if you will allow us to use that information. After participating in the study, you can decide for up to 2 weeks if you want us to remove your data. After that time, it will become impossible for us to remove it because it will already be analyzed and de-identified.

How to Obtain Results

We will provide you with a short description of community results when the study is finished. No individual results will be provided. You can obtain these results by including your contact information at the end of the signature page.

Questions

We are happy to talk with you about any questions or concerns you may have about your participation in this research study. Please contact Emily Burke (at EmilyB@dal.ca) or supervisor Sarah Moore at (778 828-7228, Sarah.Moore@dal.ca) at any time with questions, comments, or concerns about the research study.

If you have any ethical concerns about your participation in this research, you may also contact Research Ethics, Dalhousie University at (902) 494-3423, or email: ethics@dal.ca (and reference REB file #2023-6974).

SIGNATURE PAGE (Adults)

Project title: Impact of Built and Social Environment Interventions on Children's Active Transportation and Outdoor Play in Nova Scotia

Lead researcher: Emily Burke

Affiliation: School of Health and Human Performance/Healthy Populations Institute, Dalhousie University

Email: EmilyB@dal.ca

I have read the explanation about this study. I have been given the opportunity to discuss it and my questions have been answered to my satisfaction. I understand that I have been asked to take part in an interview that will occur in a private location within my community, or via Microsoft Teams, and that those interviews will be audio-recorded. I understand that direct quotes of things I say may be used without identifying me. I agree to take part in this study. My participation is voluntary, and I understand that I am free to withdraw from the study at any time, until 2 weeks after my interview is complete.

Please select all that apply to you (you can still participate in the research if you select no):

I agree that my interview may be audio-recorded Yes No

(If no, notes will be taken to record data)

I agree that direct quotes from my interview may be used without identifying me Yes No

I agree to participate in this study, and that my participation is completely voluntary. I understand that I am free to withdraw at any time up to 2 weeks after my interview, and that all my information will be kept confidential unless otherwise required to do so by law.

Yes No

Signing below will consent for me to participate in this study:

Name

Signature

Date

Please provide an email address below if you would like to be sent a summary of the study results.

Email address: _____

CONSENT FORM (Child)

This is a consent form. It is a document that gives you all the information that you need to decide if you want to participate in this project or not. Some information in this form may be hard to understand, so you can ask a trusted adult or the researcher to explain any part of it.

Project title: Impact of Built and Social Environment Interventions on Children's Active Transportation and Outdoor Play in Nova Scotia

Lead researcher: Emily Burke

Affiliation: School of Health and Human Performance/Healthy Populations Institute, Dalhousie University

Email: EmilyB@dal.ca

Who are we?

My name is Emily Burke, and I am a student at Dalhousie University. I work in the School of Health and Human Performance.

Why are we meeting with you?

We want to tell you about a study that involves Nova Scotian children. We want to know more about how you participate in physical activity and movement in your community.

Why are we doing this study?

We want to understand what might help other children in your community increase their movement. This could be through physical changes to the environment or social changes.

What will happen to you if you are in this study?

If you decide to take part in this study, you will be asked to participate in a focus group (group interview) that I lead with others in your community that will either be at a private location in your community, or online through Microsoft Teams. The interview will involve me asking you questions about your physical activity and what changes you would like to see in the community to increase your physical activity. It will take about an hour to an hour and a half.

Are there good things and bad things about this study?

What we find from this study will be used to advise changes in the community to increase physical activity. As far as we know, being in this study will not hurt you and it will not make you feel bad.

What will you receive for your participation in this study?

To thank you for your time, we will give you a e-gift card or physical gift card worth \$25 after your participation in the interview.

Who will know that you are in this study?

The things that you share during our talk will be kept confidential with the other focus group members. That means that it will only be shared with the people participating in the interview

unless you give us permission to share it with other people. Any information about you that is shared with anyone will not have your name or identifying information attached, so no one will know that they are your answers. If we feel that our research results would be supported with something you have said directly, we will ask for permission first. The people participating in this study have a strong responsibility to keep all the information about the research private and not share it with others.

My team and I won't let anyone else see your answers or any other information about you. Your friends, or family will also never see the answers that you give or the information we may write about you.

The only time we would ever share information you tell us with other people would be if you told us someone was hurting you. We would only tell the people that could help you because we want to make sure that you are safe, healthy, and happy. Also, it would be against the law to not share information if someone was hurting you.

Do you have to be in the study?

You don't have to be in this study. No one will be angry, and you won't get in trouble for not being in the study. Just tell us that you don't want to be in the study. And if you decide that you want to be in the study, but change your mind at any time, you can tell us that you no longer want to be in the study, and we can stop.

Do you have any questions?

You can ask questions any time. You can ask now, while we are talking, or after we are done talking. You can also talk to me at any time during the study. My contact information is below.

Emily Burke, School of Health and Human Performance, EmilyB@dal.ca

SIGNATURE PAGE (Child)

Project title: Impact of Built and Social Environment Interventions on Children's Active Transportation and Outdoor Play in Nova Scotia

Lead researcher: Emily Burke

Affiliation: School of Health and Human Performance/Healthy Populations Institute, Dalhousie University

Email: EmilyB@dal.ca

I have read the explanation about this study. I have been given the opportunity to discuss it and my questions have been answered to my satisfaction. I understand that I have been asked to take part in an interview that will occur in a private location within my community, or via Microsoft Teams, and that those interviews will be audio-recorded. I understand that direct quotes of things I say may be used without identifying me. I agree to take part in this study. My participation is completely my own decision, and I understand that I am free to remove my participation from the study at any time, until 2 weeks after my interview is complete.

Please select all that apply to you (you can still participate in the research if you select no):

I agree that my interview may be audio-recorded Yes No
(If no, notes will be taken to record data)

I agree that direct quotes from my interview may be used without identifying me Yes No

I agree to participate in this study, and that my participation is completely my own decision. I understand that I am free to remove my participation at any time up to 2 weeks after my interview, and that all my information will be kept confidential unless otherwise required to do so by law.

Yes No

Signing below will consent for me to participate in this study:

Name

Signature

Date

Please provide an email address below if you would like to be sent a summary of the study results.

Email address: _____

APPENDIX K: PARTICIPANT DEMOGRAPHIC QUESTIONNAIRE

Please note your responses to this questionnaire are voluntary and you can choose not to answer certain questions. Furthermore, you will not be identified by name in any research or publications resulting from this study. Only the research team will have access to identifiable data.

1. What is your full name (first, last)?

2. Which pronouns would you be most comfortable with me using to refer to you today (e.g., she/her, he/him, they/them, etc.)?

3. How old are you?

4. What racial/ethnic group(s) do you identify with (e.g., white, Black, Mi'kmaq or indigenous, etc.)?

5. What gender identity do you most identify with (female, male, non-binary, etc.)?

6. What city/town do you live in?

7. How long have you lived there?

8. What e-gift card would you prefer (Amazon, Walmart, President's Choice, etc.)?

9. What email address would like your e-gift card to be sent to?

APPENDIX L: DALHOUSIE REB APPROVAL LETTER



Social Sciences and Humanities Research Ethics Board Letter of Approval

January 18, 2024

Emily Burke
Health\School of Health and Human Performance

Dear Emily,

REB #: 2023-6974
Project Title: Impact of Built and Social Environment Interventions on Children's Active Transportation in Nova Scotia
Review Type: Delegated Review
Effective Date: January 18, 2024
Expiry Date: January 18, 2025

The Social Sciences and Humanities Research Ethics Board has reviewed your application for research involving humans and found the proposed research to be ethically acceptable in accordance with the *Tri-Council Policy Statement Ethical Conduct for Research Involving Humans*. This approval will be in effect for 12 months as indicated above. This approval is subject to the conditions listed below which constitute your on-going responsibilities with respect to the ethical conduct of this research.

Sincerely,



Dr. John Cameron
Chair, Social Sciences and Humanities Research Ethics Board