A comprehensive examination of outdoor play in licensed childcare centres in Alberta, Canada

by

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A thesis submitted in partial fulfillment of the requirements for the degree of

Master of Science

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Abstract

Background Children engage in more active play when they are outside compared to inside. With a large proportion of children attending childcare outside of the home, childcare centres have been identified as important setting for children's outdoor play. However, the duration and frequency of outdoor play in Canadian childcare centres are largely unknown. Further, the correlates of outdoor play duration and frequency have not been measured in the childcare settings. Therefore, the overall objective of this thesis was to comprehensively examine outdoor play for toddlers (19-35 months) and preschoolers (36-60 months) in childcare centres across Alberta.

Methods Participants included 240 childcare centre directors with programs for toddlers and/or preschoolers from Alberta, Canada. Directors completed a questionnaire adapted from the Go Nutrition and Physical Activity Self-Assessment for Child Care (Go NAP SACC) Outdoor Play and Learning Tool. Outdoor play duration and frequency was measured separately for toddlers and preschoolers and for winter (December-March) and non-winter (April-November) months. Various centre demographic, sociocultural, environmental, and policy correlates were also measured. Centres were categorized as meeting or not meeting the best practices for outdoor play duration and frequency, as defined by the Go NAP SACC tool. Outdoor play duration best practice was defined as 60 minutes/day for toddlers and 90 minutes/day for preschoolers. Outdoor play frequency best practice was defined as ≥3 times/day for both age groups. Chi-squared tests and multiple logistic regressions models were conducted. A frequency cut-off of ≥2 times/day was used in regression models due to frequency distributions.

Results A higher percentage of centres met the outdoor play duration best practice in the non-winter compared to winter months for toddlers (79.2% vs 24.9%) and preschoolers (55.7% vs

14.6%). More centres also met the frequency best practice in the non-winter months compared to winter months for toddlers (11.4% vs 1.4%) and preschoolers (20.2% vs 3.4%). In the final regression models, having a majority of educators with higher levels of certification was associated with a higher likelihood of meeting best practices in the winter months for toddlers (duration: OR= 2.31, 95% CI: 1.15-4.65 and frequency: OR=2.72, 95% CI: 1.43-5.19) and preschoolers (frequency: OR=2.22, 95% CI: 1.20-4.12). Centres with more frequent educator outdoor play professional development (PD; toddler winter: OR= 1.83, 95% CI: 1.15-2.93) and more family education topics on outdoor play (preschool non-winter: OR=1.83, 95% CI: 1.04-3.22) had a higher likelihood of meeting the frequency best practice. Centres with more outdoor play areas had a higher likelihood of meeting best practices in non-winter months for toddlers (duration: OR=1.56, 95% CI: 1.09-2.25) and preschoolers (duration: OR=1.41, 95% CI: 1.07-1.84) and in winter months for preschoolers (frequency: OR=1.34, 95% CI: 1.01-1.80). Other variables were inconsistent across models.

Conclusion Findings from this thesis suggest toddlers and preschoolers in childcare centres are not receiving optimal amounts of outdoor play, especially in the winter months. Further, correlates of outdoor play duration and frequency in childcare centres may differ between age groups and seasons. As such, future interventions and initiatives should target outdoor play in the child care setting. Potential areas for intervention could include educator certification and professional development, family education, and number of outdoor play areas.

Preface

Ethics approval for this study was granted from the University of Alberta Research Ethics Board. The manuscript within Chapter 3, "Examining Correlates of Outdoor Play in Childcare Centres", is formatted according to the International Journal of Behavioural Nutrition and Physical Activity (IJBNPA) where it will be submitted for publication. This manuscript is the work of Madison Predy in collaboration with Dr. Valerie Carson and Dr. Nick Holt. In detail, Madison Predy and Dr. Valerie Carson conceived and designed the study. Madison Predy oversaw the study and was responsible for data analysis, interpretation, and drafting the manuscript. Dr. Valerie Carson assisted in data interpretation and writing of the manuscript. Nick Holt critically revised the manuscript for important content, and all authors read and approved the final manuscript.

Acknowledgements

First, special thanks to my supervisor Dr. Valerie Carson for her continual support and mentorship over the past 2 years. Next, I would like to thank my committee members, Dr. Nick Holt and Dr. Candace Nykiforuk for their time and feedback. Lastly, I would like to thank my parents, extended family, friends, and Kyle for their ongoing encouragement during my degree.

I would also like to acknowledge the financial support provided by Dr. Valerie Carson through research assistantships, the Faculty of Kinesiology, Sport, and Recreation through teaching assistantships, and the Canadian Institutes of Health Research (CIHR)-Frederick Banting and Charles Best Canada Graduate Scholarship-Master's Award.

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Glossary of Terms

According to the Canadian 24-Hour Movement Guidelines, the early years are defined as the first 0 to 59 months (0-4 years) of life (Tremblay, Chaput, et al., 2017). Furthermore, the early years are broken down into infants (0 to 11 months), toddlers (12 to 35 months) and preschoolers (36 to 60 months). However, in other countries (e.g., Australia), the early years are defined as 0-5 years in national guidelines, with the preschool age group including 5-year-olds (Australian Government & Department of Health and Ageing, 2017). In the childcare setting in Alberta and in many other provinces and territories, toddlers are defined as 18 to 35 months and preschoolers as 36 to 60 months (Government of Alberta, 2017). Due to the focus on the childcare setting, this thesis will define toddlers as 18-35 months and preschoolers as 36-60 months. Additionally, this thesis will primary focus on research in early years children in the first five years of life to capture Canadian and international studies

Physical activity (PA) is defined as any bodily movement generated by skeletal muscles that result in energy expenditure above resting levels (Caspersen, Powell, & Christenson, 1985). Physical activity is often broken down into light, moderate, and vigorous intensities based on metabolic equivalents (METs). A METs value is the energy cost of an activity expressed as a multiple of resting metabolic rate (1 MET) (Jetté, Sidney, & Blümchen, 1990). In children, light-intensity physical activity (LPA) is defined as activity expending >1.5 to <4 METS, moderate-intensity physical activity as ≥4 to <6 METS, and vigorous- intensity physical activity is defined as ≥6 METS (Trost, Loprinzi, Moore, & Pfeiffer, 2011). Examples of LPA include walking leisurely or slowly exploring features of nature. Moderate- and vigorous-intensity physical activity are usually combined into one category to produce moderate- to vigorous- intensity

physical activity (MVPA). For children, MVPA may include any activity that makes a child huff and puff and/or sweaty, such as playing a game of tag, skipping rope, or chasing a ball.

Sedentary behaviour is characterized by any behaviour done while awake in a seated, reclined, or laying position that expends less than 1.5 METS (Tremblay, Aubert, et al., 2017). Common examples of children's sedentary behaviour include watching television, colouring, and playing in a sandbox, while seated.

Outdoor play, sometimes referred to as active free play or self-directed play, is often defined as any unstructured physical activity done outdoors in a child's free time (Veitch, Bagley, Ball, & Salmon, 2006). For the purpose of this thesis, outdoor play in childcare settings will also include outdoor activity that it organized or structured by early childhood educators.

In Alberta, licensed childcare centres are classified as programs that provide childcare to seven or more children by non-parental supervision (Government of Alberta, 2016). This thesis will focus on centre based childcare, which is care that occurs outside of the owner's home and has different regulations than other types of childcare programs, such as day homes.

Broadly, the term environment refers to the physical and sociocultural surroundings with which an individual interacts (Sallis & Owen, 2015). In childcare centres, examples of physical environment correlates of physical activity include available outdoor space, natural features outdoors, amount of fixed and portable equipment, and sedentary items such as screens (Tonge, Jones, & Okely, 2016). Examples of sociocultural environment correlates of physical activity within childcare settings include educator's role modeling of physical activity, educator professional development (e.g. in-person or online training), and education shared with families by centres. Similar correlates within childcare centres may exist for outdoor play.

Policies are documents or written statements used to define regulations (Vanderloo & Tucker, 2018). Specifically, this thesis will consider written policies at the childcare centre level. These policies include guidelines about a program's operations or expectations for educators, children, and families. Policies may be included in parent handbooks, staff manuals, and other documents (Ward et al., 2014)

Chapter 1: Introduction

1.1 General Introduction

The first five years of a child's life are vital for healthy growth and development (Berk, 2018). Behaviour patterns, such as physical activity and sedentary behavior, can be established in the early years and track into childhood, adolescence, and adulthood (Biddle, Pearson, Ross, & Braithwaite, 2010; Janz, Burns, & Levy, 2005). Further, these behaviours have important short-term and long-term implications for weight status and the overall healthy development of children (Carson, Lee, et al., 2017; Poitras et al., 2017). Currently, only 15% of children under the age of 5 are meeting the Canadian 24-Hour Movement Guidelines (Chaput et al., 2017; E.-Y. Lee et al., 2017). Thus, it is imperative that strategies are developed to increase the number of children meeting the recommended guidelines.

Outdoor play has gained recent attention as one potential strategy for increasing physical activity and reducing sedentary time in children (Larouche, Garriguet, & Tremblay, 2016; ParticipACTION, 2015).When children are outside, they are more likely to participate in physical activity and less likely to engage in sedentary behaviours than when inside (Vanderloo, Tucker, Johnson, & Holmes, 2013). However, outdoor play not only provides children with the physical, social, and cognitive health benefits of physical activity but also specific benefits of outdoor play. Previous studies have found outdoor play and access to nature to be associated with better spatial working memory (Schutte, Torquati, & Beattie, 2015) and self-regulation (Becker, McClelland, Loprinzi, & Trost, 2014), and decreased depressed affect (Brussoni, Ishikawa, Brunelle, & Herrington, 2017) in early years children. Positive associations with mental wellbeing (McCormick, 2017) and Vitamin D levels (Absoud, Cummins, Lim, Wassmer,

& Shaw, 2011) have also been previously reported in this age group. Given the many benefits of outdoor play, increasing opportunities for early years children to engage in outdoor play is warranted.

Just over half of Canadian children under the age of 5 attend childcare, of which 70% of are full-time (Sinha, 2014). With a large proportion of children attending childcare outside of the home, childcare centres are an important setting for early years children to have access to outdoor play opportunities. The childcare licensing bodies of many provinces and territories acknowledge the vital role that outdoor play holds in the healthy development of toddlers and preschoolers. As such, many provinces and territories mandate that centres include both indoor and outdoor play opportunities for children throughout the day (Vanderloo & Tucker, 2018) However, very few provinces or territories give specific requirements for outdoor play duration and frequency. Consequently, most Canadian childcare centres, including those in Alberta, are left with the task of determining the daily duration and frequency of outdoor play within their programs.

1.2 Objectives

The overall objective of this thesis was to comprehensively examine outdoor play for toddlers (19-35 months) and preschoolers (36-60 months) within licensed childcare centres across Alberta.

The specific objectives were to: 1) determine the average duration and frequency of outdoor play for toddlers and preschoolers in Alberta while in childcare, 2) determine if the duration and frequency of outdoor play for toddlers and preschoolers in Alberta differs between winter (December- March) and non-winter months (April-November), 3) examine the correlates

of outdoor play duration and frequency for toddlers and preschoolers in Alberta childcare centres, and 4) determine if the correlates of outdoor play differ between winter and non-winter months and between toddlers and preschoolers.

1.3 Hypotheses

1) The majority of centres will not meet the best practices of 60 and 90 minutes of outdoor play per day for toddlers and preschoolers, respectively. 2) The majority of centres will not meet the frequency best practice of 3 or more outdoor play sessions per day. 3) Childcare centres will provide toddlers and preschoolers with longer and more frequent outdoor play opportunities during the non-winter months. 4) The presence of a written outdoor play policy and a higher number of written outdoor play policy components will be the strongest correlates of outdoor play duration and frequency across winter and non-winter months and age groups.

Chapter 2: Review of Literature

2.1 Early Childhood

Early childhood or the 'early years' is a critical period for the healthy development of the physical, social, cognitive, and emotional domains (Berk, 2018). This stage of development strongly influences physical and psychosocial aspects of health and wellbeing throughout life (Irwin, Siddiqi, & Hertzman, 2007). The early years are vital to the formation of healthy movement behaviour habits, such as regular physical activity and limited sedentary behaviour, which have immediate and imminent health implications (Goldfield, Harvey, Grattan, & Adamo, 2012).

2.2 Settings

Given the limited independence from parents in the early years, young children's movement behaviours are predominantly supported and modeled by their parents in the home setting (Carson, Stearns, & Janssen, 2015; Loprinzi & Trost, 2010). Yet, in recent years the number of children attending childcare has grown, largely due to the increase in number of women returning to the workforce (Alexander, 2017). Therefore, in addition to the home setting, the childcare setting has been identified as another key setting to foster the healthy development of children (Cleveland, Forer, Hyatt, Japel, & Krashinsky, 2008).

Research suggests that the childcare environment accounts for approximately 50% of variation in preschooler's physical activity (Finn, Johannsen, & Specker, 2002; Pate, Pfeiffer, Trost, Ziegler, & Dowda, 2004). In a recent sample of children from Alberta childcare centres, one study found that toddlers and preschoolers were sedentary for 34.7 and 37.1 minutes per hour during childcare, respectively (Carson, Clark, Ogden, Harber, & Kuzik, 2015).

Comparably, a Canadian study found that up to 40.6 minutes per hour of children's time in childcare is spent being sedentary (Vanderloo et al., 2014). Evidently, there is room for the childcare setting to improve the promotion of healthy movement behaviours in line with the new Canadian 24-Hour Movement Guidelines.

2.3 Physical Activity

Guidelines

In 2017, new Canadian 24-Hour Movement Guidelines for the Early Years were released (Tremblay, Chaput, et al., 2017). These guidelines use an integrated approach to movement behaviours that includes physical activity, sedentary behaviour, and sleep. In respect to physical activity, the guidelines recommended that toddlers (12-35 months) are active for at least 180 minutes a day at any intensity, including energetic play, but more is better. Preschool aged children (36-59 months) should also have at least 180 minutes of varying physical activity throughout the day, with at least 60 minutes of energetic play (i.e. MVPA). These guidelines are similar to those recently developed in Australia (Australian Government & Department of Health and Ageing, 2017), New Zealand (Ministry of Health, 2017), South Africa (Laureus Sport for Good Foundation South Africa, 2018), and the World Health Organization (World Health Organization, 2019).

Prevalence

In a recent sample of Canadian toddlers, one study found that almost all children (99.3%) were meeting the new physical activity guidelines (E.-Y. Lee et al., 2017). However, an earlier study of Canadian toddlers found only 38% of children met the physical activity guidelines (Pujadas Botey, Bayrampour, Carson, Vinturache, & Tough, 2016). This wide variance may be

largely attributed to differences in measurement such as accelerometer type, data reduction decisions, and cut-points (E.-Y. Lee et al., 2017). For example, cut-points were found to be very influential in one Canadian study that reported the percentage of toddlers meeting the physical activity recommendations varied from 17.5% to 97.5% depending on the cut-points used (Vanderloo & Tucker, 2015). However, regardless of which cut-points were used, toddlers in this study did not accumulate high amounts of MVPA. Although there are no specific MVPA time requirements in the toddler guidelines some energetic play is recommended. Further, MVPA becomes increasingly important in the preschool years and beyond.

A recent study containing a nationally representative sample of Canadian preschoolers found that approximately 62% of preschoolers were meeting the recommendation of 180 minutes of physical activity a day, including at least 60 minutes of energetic play (MVPA) (Chaput et al., 2017). Specifically, this study found preschoolers were obtaining on average 278.8 minutes per day of total physical activity and 68.1 minutes of MVPA (Chaput et al., 2017). An earlier study by Colley and colleagues (2013) found preschoolers accumulated an average of 352 minutes per day of total physical activity and 66 minutes of MVPA.

Physical activity levels tend to track from early childhood to later in life (Telama, 2009). For example, a systematic review by Jones and colleagues (2013), focusing specifically on the tracking of physical activity through early childhood and into middle childhood (6-11 years), found 64% of included studies had moderate or large tracking. Specifically, researchers found evidence for tracking of physical activity through early childhood as well as from early childhood to middle childhood (R. A. Jones, Hinkley, Okely, & Salmon, 2013). Therefore, the early years appear to be an important time for children to form healthy behaviour habits such as meeting the recommended guidelines for physical activity. Meeting these guidelines provides

children with the best opportunity to obtain the numerous health benefits of physical activity in the short- and long-term.

Health Benefits

Physical activity habits that are formed in the early years have significant implications for healthy growth and development (Hills, King, & Armstrong, 2007). A recent extensive systematic review by Carson and colleagues (2017) found physical activity was favourably associated with motor development, cognitive development, psychosocial health, bone and skeletal health, and cardiometabolic health in early years children. An earlier review by Timmons and colleagues (2012) found similar results to this recent review. However, in contrast to the Timmons et al. (2012) review the Carson and colleagues (2017) review did not find consistent favourable associations between physical activity and adiposity. It is possible that physical activity alone does not play a large role in adiposity during the early years. Instead, the composition of physical activity, sedentary behaviour, and sleep over a full day may have a larger association (Carson, Tremblay, & Chastin, 2017). Although physical activity may not be strongly associated with adiposity in the early years, there is evidence that physical activity is associated with adiposity in older children (Poitras et al., 2016). Given that physical activity tracks throughout life it is important that healthy habits are established at a young age (Janz et al., 2005; Telama, 2009). Furthermore, there is evidence that some adult onset diseases originate in the early years (Berenson et al., 1998). Therefore, the negative effects of poor physical activity habits in the early years might not present themselves immediately but might accumulate and present later in life.

2.4 Sedentary Behaviour

Guidelines

The new Canadian 24-Hour Movement Guidelines for the Early Years have also made detailed recommendations for the sedentary behaviours of children aged 0-4 years (Tremblay, Chaput, et al., 2017). For toddlers and preschoolers, it is recommended that children are not restrained for more than an hour at a time (e.g. in a car seat, high chair, stroller) or sitting for prolonged periods. When sedentary, young children should engage in activities such as reading and storytelling. For children under two years of age, the guidelines recommend no screen time. For children two years and older, screen time should be no more than 1 hour per day, but less is better. It is important to note that due to limited evidence on how much total sedentary behaviour is detrimental for health, there are currently no specific recommendations included in the guidelines for this age group.

Prevalence

There is evidence to suggest that children under the age of 5 spend a large amount of time engaging in sedentary behaviour (Goldfield et al., 2012). In a recent sample of Canadian toddlers, it was found that children accumulated an average of 316.7 minutes (5.28 hours) a day of sedentary time, and only 15.2% of toddlers were meeting the screen time recommendation (E.-Y. Lee et al., 2017).

In pre-school aged children, Chaput and colleagues (2017) found only 24.4% of Canadian pre-school aged children were meeting the screen time recommendation of less than 1 hour per day. This low percentage is similar to that found in an earlier Canadian study which reported that only 18% of children aged 3 and 4 years met the screen time recommendation (Colley et al.,

2013). This same study also reported that children ages 3 and 4 spent 348 minutes (5.8 hours) per day, or approximately 50% of their waking time, engaged in sedentary behaviour (Colley et al., 2013). This current trend of high sedentary behaviour and increased screen time exposure in young children is concerning due to the associated health risks.

Health Risks

It has been recognized that too much sedentary behaviour can have negative health consequences, some of which are distinct from the health risks of physical inactivity (Biswas, Oh, Faulkner, & et al., 2015). Although some forms of sedentary behaviour (ex: crafts, reading) play an important role in young children's development and learning (Carson, Kuzik, et al., 2015; Tremblay, Chaput, et al., 2017), high levels of sedentary time, and especially screen time, are of great concern for children's health. An extensive systematic review completed by Poitras and colleagues (2017) found associations between sedentary time in children aged 0-4 years and health indicators, such as motor development and adiposity, were predominantly null. However, the systematic review found that screen-based sedentary activities were largely unfavourable or null for health indicators such as motor and cognitive development, adiposity, and psychosocial health (Poitras et al., 2017). Similar findings were reported in a review, which concluded that TV viewing by children had significant negative associations with cognitive development (Carson, Kuzik, et al., 2015). Ultimately, total sedentary time may have little impact on children's healthy development. However, the type of sedentary behaviour that children engage in may be an important indicator for health (Carson, Kuzik, et al., 2015; Poitras et al., 2017). One strategy for decreasing screen time and increasing physical activity may be through outdoor play opportunities.

2.5 Outdoor Play

Introduction to Play

Play can be defined as an activity done for fun and amusement, and is often self-directed with no external goal (Smith, 2010). Play has been identified as an important component of healthy development and is recognized by the United Nations High Commission for Human Rights as a fundamental right for every child (Office of the United Nations High Commissioner for Human Rights, 1989). Within the broad category of play several sub-types of play have been identified, including social contingency play, sensorimotor play, object play, language play, fantasy/pretend play, and physical activity play (Smith, 2010). A recent review found that physical activity play, also known as active play, has been defined numerous times in literature for young children using common terms such as swinging, climbing, balancing, jumping, rolling, running and skipping (Truelove, Vanderloo, & Tucker, 2017). Based on this review, a definition of active play was developed: "A form of gross motor or total body movement in which young children exert energy in a freely chosen, fun, and unstructured manner" (Truelove et al., 2017, p. 164). Active play can occur indoors and outdoors, however the focus of this thesis will be on outdoor play that is self-directed or educator led.

Prevalence

Several sources have reported that children's outdoor play has been declining in recent decades (Gray, 2011; Hofferth, 2009; Karsten, 2005; Skår & Krogh, 2009). The decline in outdoor play may be attributed to various factors including heightened parental and caretaker concern (Clements, 2004; Tremblay et al., 2015; Veitch et al., 2006) and children's significant increase in sedentary screen time (L. R. Larson, Green, & Cordell, 2011). Limited evidence exists on the prevalence of outdoor play among early years children in Canada. Data from the

Canadian Health Measures Survey (CHMS) indicates Canadian children ages 3 to 4 spend an average of 1.6 and 2.1 hours per day outside when cared for at home or in a non-school setting, respectively (ParticipACTION, 2018). Overall, it is unclear whether children are maximizing the many health benefits associated with outdoor play.

Health Benefits

When children play outdoors they are more active and less sedentary than when they play inside (ParticipACTION, 2015; Tremblay et al., 2015; Vanderloo et al., 2013). Outdoor play increases children's physical activity by affording them the opportunity to engage in activities that may not be permitted indoors due to limited amount of space and equipment (Tonge et al., 2016). Therefore, outdoor play contributes to gross motor development and improved health indicators associated with physical activity, as mentioned previously (Carson, Lee, et al., 2017). However, it is important to note that the benefits of outdoor play extend beyond the well-known benefits of physical activity.

Outdoor play provides multiple benefits for children's overall health and wellbeing. Studies have found that outdoor play has favourable effects on Vitamin D levels (Absoud et al., 2011), which is important for children's healthy bone development and prevention of multiple chronic diseases (Papandreou, Malindretos, Karabouta, & Rousso, 2010). Further, outdoor play has been associated with reduced vision problems in older children and adolescents (L. A. Jones et al., 2007; Sherwin et al., 2012; Yang et al., 2018); however more research is needed in early years children regarding these health outcomes. Research specifically in early years children does suggest that outdoor play and access to nature may be associated with better spatial working memory (Schutte et al., 2015) and self-regulation (Becker et al., 2014), decreased depressed affect (Brussoni et al., 2017), and improved overall mental wellbeing (McCormick, 2017). For

children with Attention Deficit Hyperactivity Disorder (ADHD), outdoor play has been associated with reduced symptoms (Kuo & Taylor, 2004). However, evidence on the association between outdoor play and children's weight status is inconsistent (Ansari, Pettit, & Gershoff, 2015; Sisson et al., 2016; Söderström et al., 2012). Along with the evidence supporting the multiple benefits of outdoor play it is important to also consider the perceived risk associated with outdoor play.

Perceived Risk

One of the largest identified barriers to children's outdoor play is parent's perceived risk for safety. Common concerns include stranger abduction, child pedestrian collisions, and injuries (Tremblay et al., 2015). However the 2015 ParticipACTION Report Card on Physical Activity for Children and Youth found that outdoor play is safer than parents think (ParticipACTION, 2015). In fact, the odds of stranger abduction in Canada are approximately 1 in 14 million (Dalley & Ruscoe, 2003), and studies have found that children are more likely to be killed in a motor vehicle accident as a passenger of a vehicle than as a pedestrian or riding their bike (Public Health Agency of Canada, 2012). While injuries are common in all forms of physical activity, not just outdoor play, the vast majority of these injuries are minor (ParticipACTION, 2015). Findings from Nauta and colleagues (2015) systematic review found that although reports of injuries from unstructured play, including outdoor play, are higher than those reports from organized sport or active transport, the incident rate of medically treated injuries per 1000 hours of unstructured physical activity was lower than for sports or active transport. Despite the findings that most injuries in unstructured outdoor play are a minor threat to children's overall wellbeing, parents are increasingly monitoring their children's outdoor play (Tremblay et al., 2015).

In addition to concerns for safety and increased surveillance, changing parental ideals have also been attributed to children's reduced participation in outdoor and active free play (Holt et al., 2016; Pynn et al., 2018). In a recent study, Pynn et al. (2018) found the majority of parents felt as though they needed to be more involved with their children and that it would be socially unacceptable to not supervise their children's play. This paper also suggested that simply asking parents to let their children play unsupervised would not be effective at increasing active free play as this is contradictory to the current parenting ideals reported in the study (Pynn et al., 2018). Instead, creating spaces where children can play freely but still be supervised by adults other than their parents might be effective in increasing children's outdoor and free play. For early years children, the childcare setting may be an ideal space for this to occur.

2.6 Outdoor Play in Childcare

Prevalence

The childcare environment has been identified as a key setting for outdoor play opportunities (Mazzucca et al., 2018; Razak et al., 2018; Truelove et al., 2018). However, studies on the amount of time that toddlers and preschoolers spend outdoors in childcare are limited, especially within the Canadian context. A small study of five childcare centres in London, Ontario found that preschoolers were spending 55 to 180 minutes playing outside per day, while in childcare (Vanderloo et al., 2013). In an international systematic review and meta-analysis by Truelove et al. (2018) outdoor play time in childcare centres ranged from 10 minutes (Dyment & Coleman, 2012) to 211 minutes (Raustorp et al., 2012), with a mean time of 45.2 minutes in a 7.5 hour day, across 26 included studies. In addition to outdoor play duration, the frequency of outdoor play sessions during childcare is also important to consider as increasing the frequency of outdoor play sessions has been suggested as one potential strategy for increasing children's

MVPA. Unfortunately, outdoor play frequency is studied even less than outdoor play duration. The limited amount of studies from Canada reporting the average outdoor play duration and frequency provided to toddlers and preschoolers while in childcare warrants more research. This thesis will help fill this gap in the literature.

Physical Activity During Outdoor Play

In a recent review by Tonge and colleagues (2016) outdoor environments within childcare were positively associated with children's physical activity in 6 of 7 studies reviewed. However, it is important to recognize that young children do not spend the entire duration of outdoor play time engaging in physical activity (Benham-Deal, 2005; Truelove et al., 2018). Physical activity in the early years is characterized by intermittent bursts of high intensity activity followed by lower intensity activity and sedentary behaviour (Bailey et al., 1995). As such, children's outdoor play has similar patterns. In a recent meta-analysis, it was found that young children in childcare centres spend between 6.7% (Raustorp et al., 2012) and 43% (Tandon, Saelens, & Christakis, 2015) of their outdoor time engaged in MVPA, with a mean of 17.8% (Truelove et al., 2018). Although the mean percentage of 17.8 represents a small amount of time, when compared to time spent engaging in MVPA while indoors the difference is significant. A Canadian study found that while indoors and outdoors preschoolers spent a mean of 0.54 and 5.03 minutes per hour participating in MVPA, respectively (Vanderloo et al., 2013). When comparing total physical activity (TPA), the same study found preschoolers participated in TPA for 14.42 minutes per hour while indoors and 31.68 minutes per hour while outdoors (Vanderloo et al., 2013).

The frequency of outdoor play sessions has been found to have an impact on the amount of MVPA children engage in while outside. Multiple studies have found that children are the

most active at the beginning of outdoor periods, while their activity levels continually decline over the session (Greever, Sirard, & Alhassan, 2015; McKenzie et al., 1997; Pate, Dowda, Brown, Mitchell, & Addy, 2013). Therefore, it has been suggested that scheduling shorter but more frequent outdoor play sessions may be effective at increasing the amount of physical activity children engage in. Two studies have examined the effects of scheduling more outdoor play sessions throughout out the day, while not increasing the total amount of outdoor time (Razak et al., 2018; Tucker et al., 2017). A study by Razak et al. (2018) found that the intervention group, which had 3 scheduled outdoor sessions per childcare day, had significantly more MVPA at follow-up than the control group, which had only one outdoor play session per day. Specifically, the intervention group obtained 5 more minutes of MVPA at follow-up than the control group, despite spending less time outside. In a similar study from London, Ontario, researchers found that the intervention group, which implemented four outdoor play sessions, increased children's MVPA by 1.28 mins per hour compared to the control group, which had two outdoor play sessions (Tucker et al., 2017). However, it should be noted that staff training and provision of portable play equipment was also included in the intervention and therefore effectiveness of the intervention cannot be attributed solely to the scheduling of outdoor play sessions.

Sedentary Behaviour During Outdoor Play

Since children do not spend all of their outdoor time engaged in physical activity, many studies have reported the amount of time children spend sedentary during outdoor play time at childcare. A recent systematic review of objectively measured sedentary behaviour found that when children are outside during childcare they spend an average of 55% of their time engaged in sedentary behaviour (Truelove et al., 2018). Despite this high proportion of outdoor time

being spent sedentary, other studies have reported that preschoolers can spend up to twice the amount of time being sedentary while indoors compared to outdoors (Vanderloo et al., 2013). Outdoor play time and children's subsequent physical activity and sedentary behaviour levels may be influenced by childcare centre demographics, sociocultural and physical environmental characteristics of the childcare setting, centre-based policies, provincial/territorial legislation, and seasons.

Ecological Perspective

Ecological models are a useful framework for understanding the multiple levels of correlates and determinants of health behaviours (Sallis & Owen, 2015). Ecological models postulate that individual behaviours, such as outdoor play, are influenced by multiple levels such as intrapersonal, social, organizational, environmental, and public policy levels (Sallis et al., 2006). Within each level lie multiple variables that interact with other variables in the same level as well as variables in other levels, ultimately shaping behaviour (Sallis & Owen, 2015). Interactions can occur from a distal to proximal levels but can also occur from proximal to distal levels. For example, a provincial regulation on the amount of time required for children to spend outside during childcare would ideally result in centres increasing outdoor play time to meet this requirement, thus a trickle-down effect is seen from distal to proximal levels. Conversely, a proximal to distal interaction would be observed if evidence for high amounts of outdoor play in childcare centres was used to support the creation of public policy.

One ecological model specific to active outdoor play has been developed (H. Lee et al., 2015). Using evidence from a meta-study of qualitative research, child, parent, neighbourhood, society, and policy levels were identified (H. Lee et al., 2015). Although this model largely focused on independent outdoor play in the neighbourhood setting some levels such as child,

society, and policy levels may have relevant characteristics to the childcare setting. Further, characteristics of the parent level, such as concerns for safety, are also likely common with educators due to their own beliefs, pressure from parents, and/or anxiety around licensing and accreditation.

Using an ecological perspective allows complex health behaviours, such as outdoor play, to be examined from multiple levels. Focusing on multiple levels allows researchers to identify key variables to target for future interventions (Sallis, Bauman, & Pratt, 1998). The outdoor play correlates examined in this thesis were organized into categories that reflect those used in ecological models, including centre demographics.

Centre Demographic Correlates

Currently, there is little available evidence on the centre demographic correlates of children's outdoor play duration and frequency. However, it is worth noting that there are studies that have examined the association of centre characteristics and children's physical activity levels. For example, one study found young children were more active on playgrounds at preschools with a majority of college-educated teachers compared to children at preschools with fewer college-educated teachers (Dowda, Pate, Trost, Almeida, & Sirard, 2004). Similarly, a study of 49 early care and education centres in North Dakota reported that teachers having more than 10 years of early childhood education experience was positively associated with MVPA for children during outdoor time (Mazzucca et al., 2018). In another study, lower staff-child ratios was found to be associated with more MVPA but centre size (based on number of total children) was not significantly associated with MVPA (Sugiyama, Okely, Masters, & Moore, 2010). Given that outdoor play often involves opportunities for physical activity, it is possible that

centre demographics may also be associated with children's outdoor play duration and frequency.

Sociocultural Correlates

Similar to centre demographic correlates, there is a limited amount of literature on the sociocultural correlates of children's outdoor play duration and frequency in the childcare setting. However, numerous studies have reported positive associations between physical activity professional development (PD) for educators and children's physical activity in childcare settings (Bower et al., 2008; Dowda et al., 2009; Trost, Ward, & Senso, 2010; Tucker et al., 2017). Hence, it is possible that professional development opportunities on outdoor play may be favourably associated with children's outdoor play duration and frequency at childcare. Further, studies have found that outdoor play during childcare is often not valued by educators (Copeland, Kendeigh, Saelens, Kalkwarf, & Sherman, 2012) and parents (Copeland, Sherman, Kendeigh, Kalkwarf, & Saelens, 2012). Thus, increasing PD opportunities for educators and providing education to parents may increase buy-in from these two important stakeholder groups.

Physical Environment Correlates

Although many studies have examined the environmental correlates of children's physical activity levels during outdoor play (Boldemann et al., 2006; Hodges, Smith, Tidwell, & Berry, 2013; Tonge et al., 2016) there are few studies on the environmental correlates of children's outdoor play duration and frequency. Studies that have examined the environmental correlates of children's outdoor play often focus on older children in the home and neighbourhood setting. For example, studies have identified correlates of older children's outdoor play such as having a backyard, living in close proximity to green space or cul-de-sacs,

and having friends in the neighbourhood (Brockman, Jago, & Fox, 2011; Veitch et al., 2006; Veitch, Salmon, & Ball, 2010). However, many of the physical environment correlates from the home and neighbourhood setting do not translate to the childcare setting. As such, this thesis aims to fill this gap in research by identifying physical environment correlates of outdoor play in childcare centres.

Centre Based Polices

A recent review by Stacey and colleagues (2017) found that centre based policies are often modifiable to effectively increase physical activity and outdoor play. One recent study of physical activity and screen-viewing policies in Canadian childcare centres found 63.0% of centres had a policy for children's outdoor play time, 67.5% of centres had a policy on appropriate outdoor wear, and 40.1% had a policy on outdoor play area size (Ott, Vanderloo, & Tucker, 2019). However, it is important to note that this sample is likely not representative of Alberta childcare centres as only 31 of 243 centres contacted from Alberta responded.

In addition, several studies from the United States have examined this topic. Similar to Canada, childcare in the United States is regulated individually by States, and childcare centres can create centre based policies to augment the state standards (N. Larson, Ward, Neelon, & Story, 2011). A study by Erinshino and colleagues (2016) found that in a sample of 50 centres from North Carolina, 66% of centres had written policies about the amount of outdoor playtime offered to children each day. In the same study, researchers unexpectedly found that having a written policy on the amount of outdoor play time was associated with less observed outdoor play time (63.6 mins vs 78.5 mins) (Erinosho et al., 2016). Further, having a written policy on outdoor time had a significant negative association with MVPA (5.3 min/h vs 5.9 min/h) and a significant positive association with sedentary time (31.6 min/h vs 29.8 min/h) (Erinosho et al.,

2016). These findings may be explained by the lack of translation from policies to practices due to limited training and education programs available for educators and directors (Erinosho et al., 2016). Furthermore, the actual content of the policy may be important to consider, as some may be restrictive (e.g., weather-related policies).

Only one study reporting weather-related policies in childcare centres was found. In a study of 162 childcare centres from a single county in Ohio, United States, it was found that weather related policies were highly variable across the county (Copeland et al., 2011). Interestingly, researchers found that the average weather-related policies in the centres would restrict outdoor play for approximately 179 days (46%) of the year (Copeland et al., 2011). Although centre based policies play an important role in children's access to outdoor play, it is important to consider the provincial and territorial legislation regarding outdoor play in childcare centres which may be driving the policies and practices of individual centres (Ott et al., 2019).

Provincial/ Territorial Legislation

In Canada, childcare is legislated by the government of each province or territory. This results in a wide range of regulations for centres, including outdoor play requirements. In a recently updated review of physical activity and sedentary behaviour legislation in Canadian childcare facilities, Vanderloo and Tucker (2018) found all provinces and territories require outdoor play opportunities for children during childcare. However, only 2 provinces were more specific with their outdoor play time requirements. Nova Scotia requires childcare centres to provide children with two outdoor play periods per day (Province of Nova Scotia, 2017), while Ontario specifies that for every 6 hours a child is in childcare, children must be provided with 2 hours of outdoor play (one hour in the morning and one hour in the afternoon) (Government of Ontario, 2014). Further, seven of the thirteen provinces and territories also note that outdoor play

opportunities are offered "weathered permitting" (Vanderloo & Tucker, 2018). Yet, only the Province of Manitoba sets supplemental guidelines for when weather is considered as inclement (Government of Manitoba, 2016). Lastly, it is interesting to note that the outdoor space requirements for Alberta childcare centres are some of the lowest in the country. In Alberta, outdoor play space must be $\geq$2 m^2 for each child under 19 months and $\geq$4.5 m^2 for each child over 19 months (Government of Alberta, 2016). This space requirement is quite small compared to provinces such as British Columbia, Manitoba, Nova Scotia, Prince Edward Island, and Saskatchewan which require a minimum of 7 m^2 of outdoor play space per child (Vanderloo & Tucker, 2018).

In general, the regulations around outdoor play opportunities are vague. The licensing regulations set by the provincial and territorial Ministries may lack details and specifics in order to limit the restriction on childcare centre programming. However, the lack of specific requirements affords centres the opportunity to interpret these guidelines as they like, thus creating a wide range of variability in opportunities for children across centres (Vanderloo & Tucker, 2018). Ultimately, this may result in many centres providing children with limited outdoor play opportunities during their time in childcare.

Seasonal Variation

Seasons, weather, and daylight hours have been identified as correlates for children's physical activity (Bingham et al., 2016; Carson & Spence, 2010; Rich, Griffiths, & Dezateux, 2012). In a systematic review by Carson and Spence (2010) researchers found physical activity was higher in the spring/summer months compared to fall/winter months in most studies from Europe, Canada, and the United States. This is likely explained by lower temperatures and

limited daylight experienced in the Northern Hemisphere's winter months (Carson & Spence, 2010).

Literature on seasonal variation and outdoor play for early years children is sparse. However, one study of parent reported outdoor play time found preschooler's in Ohio engaged in highest levels of outdoor play during summer months and the lowest levels during winter months (Burdette, Whitaker, & Daniels, 2004). Specific to the childcare setting, only one small study was identified. Schuna and colleagues (2013) reported that outdoor play time was reduced by 60% from fall to winter months in a small sample of North Dakota preschools. Overall, very little research has been done on the effect of seasonal variation on outdoor play opportunities during childcare. This suggests that seasonal variation of outdoor play may be particularly important to examine in the child care setting, especially during the winter in northern cities where children are often in childcare during the limited hours of daylight and the warmest part of the day (Carson & Spence, 2010). This thesis will help fill this gap in the literature.

2.7 Summary

In recent years there have been many studies regarding physical activity, outdoor play, and the importance of the childcare setting. However, there are key gaps in literature pertaining to outdoor play in childcare centres in Canada. Specifically, studies on the frequency and duration of outdoor play in centres, seasonal variation, and the correlates of outdoor play in centres are limited. Although many American studies have measured outdoor play in childcare (Erinosho et al., 2016; Mazzucca et al., 2018; McWilliams et al., 2009; Tandon et al., 2015) and centre based policies (Copeland et al., 2011; Erinosho et al., 2016; Story, Kaphingst, & French, 2006), studies from Canada are limited. There is limited generalizability of findings from the United States to Canada due to differing licensing requirements, staff education, and cultural

differences. Additionally, many of these American studies have been based in North Carolina, which has a considerably different climate than Alberta, Canada. Thus, it is warranted to study the frequency and duration of outdoor play across seasons in Alberta as well as the correlates of outdoor play across seasons. Ultimately, this thesis contributes novel research on the status of outdoor play in Alberta childcare centres, which may further impact licensing and accreditation standards, and centre based policies, therefore providing children more opportunities to meet the Canadian 24-Hour Movement Guidelines.

Chapter 3: Research Study

Examining Correlates of Outdoor Play in Childcare Centres

This manuscript will be submitted to the International Journal of Behavioural Nutrition and Physical Activity (IJBNPA) and is presented according to the journal requirements.

3.1 Abstract

Background: Childcare centres are an important setting for young children to engage in outdoor play. The objectives for this study were to: 1) determine the average outdoor play duration and frequency for toddlers (19-35 months) and preschoolers (36-60 months) in childcare centres, 2) determine if duration and frequency differed across winter (December-March) and non-winter (April-November) months, and 3) examine correlates of outdoor play duration and frequency.

Methods: Participants were 240 directors of childcare centres with toddler and/or preschool programming in Alberta, Canada. Directors completed a questionnaire adapted from the Go Nutrition and Physical Activity Self-Assessment for Child Care (Go NAP SACC) Outdoor Play Tool that measured outdoor play separately for toddlers/preschoolers and winter/non-winter months. Consistent with the tool, centres were categorized as meeting or not meeting best practices for outdoor play duration (toddler: ≥60 minutes/day; preschooler: ≥90 minutes/day) and frequency (≥3 times/day). The questionnaire also measured demographic, sociocultural, environmental, and policy correlates. Chi-squared tests and multiple logistic regression models were conducted. A frequency cut-off of ≥2 times/day was used in regression models.

Results: More centres met the outdoor play duration and frequency best practices in non-winter compared to winter months for toddlers (duration: 79.2% vs 24.9%; frequency: 11.4% vs 1.4%) and preschoolers (duration: 55.7% vs 14.6%; frequency: 20.2% vs 3.4%). In final models, higher educator certification was associated with a higher likelihood of meeting best practices in the winter months for toddlers (duration and frequency) and preschoolers (frequency). More frequent educator professional development (PD; toddler winter) and more family education topics (preschool non-winter) were associated with a higher likelihood of meeting the frequency best practice. More play areas was associated with a higher likelihood of meeting best practices in

non-winter months for both age groups (duration) and in winter months for preschoolers (frequency). No other consistent associations were observed.

Conclusions: Findings from this study suggest that correlates of outdoor play may differ across age groups and seasons. Interventions aimed at increasing outdoor play in childcare centers appear warranted, especially in winter months for northern locations. Educator certification and PD, family education, and play areas may be promising intervention targets.

Key Words: Toddlers, Preschoolers, Early years, Childcare, Outdoor play

3.2 Background

The first five years of a child's life, also referred to as 'the early years', is an imperative period for healthy growth and development (1). Play, often described as a self-directed activity done for fun and amusement, is a fundamental component of development during this life stage (2). In fact, play is so vital for children's development, it has been recognized by the United Nations High Commission for Human Rights as a fundamental right for every child (3). Several sub-types of play have been identified including sensorimotor play, object play, fantasy play, and active play (2). Active play is "a form of gross motor or total body movement in which young children exert energy in a freely chosen, fun, and unstructured manner" (4) (p.164), and can occur in both indoor and outdoor settings. However, children often engage in more active play when outdoors because gross motor activities are typically limited or prohibited indoors (5). Unfortunately, outdoor play has been declining in recent decades largely due to children's increased use of technology (6) and parents' safety concerns (7, 8).

Declining outdoor play and the subsequent opportunities for active play is a concern because active play provides early years children with the well-known physical, social, and cognitive health benefits of physical activity (9). In early years children, outdoor play and access to nature has also been associated with decreased depressed affect (10), better spatial working memory (11) and self-regulation (12), and improved overall mental wellbeing (13). Additionally, outdoor play has been found to have positive associations with vitamin D levels (14), which is important for the healthy development of bones and teeth and the prevention of multiple chronic diseases (15).

Given the numerous benefits of outdoor play for early years children, it is important to identify correlates of outdoor play that could be targeted in future interventions and initiatives.

Early years children can engage in outdoor play near the home (e.g., backyard), in their neighbourhood (e.g., parks), and in childcare settings. Previous studies have focused on identifying correlates of outdoor play in older children (8, 16, 17) or the home and neighbourhood setting in early years children (18). There is currently little research on the correlates of early years children's outdoor play in childcare centres. This represents an important gap in the literature because many children spend a large number of waking hours in non-parental care (19). Therefore, the childcare setting can provide a large number of children with regular opportunities for outdoor play.

The objectives of this study were to: 1) determine the duration and frequency of outdoor play time for toddlers and preschoolers in Alberta while in childcare, 2) determine if duration and frequency of outdoor play time for toddlers and preschoolers in Alberta differs between winter and non-winter months, and 3) examine the centre demographic, environmental, sociocultural, and policy correlates of outdoor play duration and frequency for toddlers and preschoolers in Alberta childcare centres.

3.3 Methods

Participants and Procedures

Participants included directors of licensed childcare centres with full-time programming for toddlers (19-35 months) and/or preschoolers (36-60 months) in the province of Alberta, Canada. Eligible childcare centres were identified through lists provided by provincial licensing agency offices and through an online childcare lookup tool (20). A total of 897 centres were identified and contacted between May and November 2018. Centres with publicly listed emails were emailed a brief introduction to the study followed by a unique link to a detailed letter of information, consent form, and questionnaire through REDCap, an electronic data capture tool

(21). Email reminders were sent on the 7th and 14th day following the initial email, if required. If centres did not respond to the e-mails they were later followed-up by telephone. Centres were also contacted by phone if they did not have a publicly listed email. If a director was interested in participating their e-mail was obtained or paper copies of study materials were sent (n=4). All participants had the opportunity to be entered into a draw for one of ten $50 resource/equipment items of their choice.

Of the 897 centres identified, 13 centres were ineligible for the following reasons: part time programming (n=3), no toddlers or preschoolers (n=2), drop-in programs only (n=3), or permanently closed or closing soon (n=5). Of the remaining 885 centres, it was not possible to contact 44 directors via e-mail or phone. Additionally, a small number of centres declined because they were too busy (n=7) or not interested (n=11), leaving a sample of 823 participants. Ethics approval was granted from the University of Alberta Research and Ethics Board. All participating directors provided written informed consent.

Measures

Outdoor play in this study was defined as any time that children were outside playing, including free play and instructor-led play. Outdoor play duration and frequency as well as centre demographics, environmental, sociocultural, and policy correlates were measured with a modified version of the Go Nutrition and Physical Activity Self-Assessment for Child Care (Go NAP SACC) Outdoor Play and Learning Tool from the Center for Health Promotion and Disease Prevention and Department of Nutrition at the University of North Carolina at Chapel Hill (22). The Go NAP SACC tool includes best practices guided by current research and expert opinion, though participants in this study were not aware of what the best practices were. Inter-rater reliability (Kappa statistic: 0.46-0.71; % agreement: 57.9-89.5), test-retest reliability (Kappa

statistic: 0.25-0.41; % agreement: 44.8-75.2), and criterion validity (Kappa statistic: 0.16-0.79; % agreement: 52.2- 90.6) have been previously reported for some of the questions in this tool (23).

Outdoor Play Duration and Frequency

Directors were asked to report the average daily outdoor play duration and frequency separately for two age groups (toddlers and preschoolers) and seasons (winter: December to March and non-winter: April to November). There were 7 options for duration, ranging from <30 minutes to ≥120 minutes. There were 5 response options for frequency, ranging from never to ≥3 times a day. The best practice for outdoor play duration was defined as ≥60 minutes/day for toddlers and ≥90 minutes/ day for preschoolers and the best practices for daily frequency was defined as ≥3 times/day for both age groups (22). However, because so few centres met the best practice of ≥3 times/day, specifically in the winter months, the frequency best practice of ≥2 times/day was also calculated.

Centre Demographic Correlates

The research team added centre demographic questions to the Go NAP SACC Outdoor Play Tool. Directors were asked to report on the number of toddlers, preschoolers, and total number of children in their centre, the number of part-time and full-time educators, and the educator's certification level. Educator certification level was dichotomized into <50% and ≥50% of centre educators with level 2 (Child Development Worker) or level 3 (Child Development Supervisor) certification. Directors were also asked to report the population size of the municipality that their centre was located in (rural= less than 1000, small population centre= 1000-29999, medium population centre= 30000 to 99999, large urban population centre= 100000 or more) and the accreditation status of their centre (not accredited, in the process, accredited). In Alberta,

childcare accreditation is based on standards of excellence from current research and leading practices (24).

Sociocultural Correlates

The sociocultural correlates included professional development (PD) for educators on outdoor play and education offered to families on outdoor play. Directors were asked to report how often their educators receive outdoor play PD such as in-person or online training, or information presented at staff meetings. If directors answered that their educators received PD, they were asked to indicate the topics of the PD (amounts of outdoor playtime, using outdoor play time and space to encourage children's physical activity, communicating with families about outdoor play, the program's policies on outdoor play, other). Descriptions of 'other' PD topics were evaluated, and if deemed appropriate added to the other topics to get a total of PD topics for each centre. Directors were also asked to report how often families received education on outdoor play through in-person sessions, handouts, newsletters, or similar methods. Similar to PD, if directors indicated that education was offered to parents the directors then marked which topics were provided (amounts of outdoor playtime, using outdoor play time and space to encourage children's physical activity, the program's policies on outdoor play, other). If 'other' was answered, responses were evaluated and then added to the total number of education topics, if applicable.

Environmental Correlates

The environmental correlates included outdoor space, number of outdoor play areas, and portable play equipment for outdoors. For outdoor space, directors were asked to report the amount of space in relation to the number of children who would use the space at one time. There were four response options ranging from not available to large enough for all children to run around safely.

For number of outdoor play areas, directors were asked to report the number of areas their centre had for toddlers and preschoolers separately. Play areas were defined as areas that offer different opportunities for children such as a swing set, sand box, climbing structure, garden, etc. There were four response options ranging from 1-2 play areas to ≥8 play areas. For portable play equipment, directors were asked to report the different types of portable play equipment (e.g., jumping toys, push-pull toys) available for toddlers and preschoolers outside from a comprehensive list. The different types of portable play equipment were totaled and categorized into one of four categories ranging from none to 6-8 types, as per the Go NAP SACC tool (22). Directors also reported how often portable play equipment was available outdoors and the amount of portable play equipment available outdoors for the toddlers and preschoolers in their centre. There were four response options for both questions, ranging from rarely/never to always and very limited to not limited, respectively.

Policy Correlates

Policy in the GO NAP SACC tool is defined as written policy guidelines including information on a program's operations and expectations for educators, children, and families. Written policies could be included in parent hand books, staff manuals, or other documents. Directors were asked if their centre had a written policy for outdoor play. If the centre had a policy, directors were then asked to report the topics included in their policy (total amount of daily outdoor play time, frequency of outdoor play opportunities per day, appropriate clothing for all seasons, safe sun exposure for educators and children, guidelines for unsuitable weather, not taking away outdoor play time to manage behaviour, outdoor play PD for educators, education for families on outdoor play, other). These items were added to get a total number of policy topics for each centre, including appropriate responses for 'other'.

Statistical Analyses

Statistical analyses were performed using STATA (version 15) software (25). Descriptive statistics were calculated for centres' demographic, sociocultural, environmental, and policy characteristics. To address objective 1, descriptive statistics were also calculated for average daily duration and frequency of outdoor play. To address objective 2, chi-squared tests were used to determine if the percentage of centres meeting the best practice for outdoor play duration and frequency were different between the winter and non-winter months for both toddlers and preschoolers. To address objective 3, a series of logistic regression analyses were conducted to examine the correlates of meeting the best practice for outdoor play duration and frequency. Analyses were run separately for each age group (toddler and preschool) and season (winter and non-winter). First, bivariate logistic regression analyses were conducted for each correlate. Final models were conducted using multiple logistic regression that included all correlates with a $p<0.10$ in the bivariate models. Ordinal variables were used in all models, where applicable, due to smaller cell sizes for some responses, and ≥2 times per day was used as the frequency best practice due to smaller cell sizes for some responses. Final models were checked for multicollinearity using variance inflation factors (VIF). Correlates with a VIF ≥10 were removed one at a time (26), starting with the largest value until all correlates had a VIF <10. In the case of two correlates with similar VIF ≥10, each correlate was removed one at a time to determine best model fit measured by pseudo R-squared statistics. Statistical significance was defined as $p<0.05$.

3.4 Results

Of the 823 directors that were contacted, 240 centres responded with complete data (221 for toddlers and 239 for preschoolers). From the remaining 583 directors, 113 only partially

completed the survey. The remaining directors either did not go to the survey link or were not interested in participating in the study after reading the letter of information. The demographic, sociocultural, environmental, and policy characteristics of participating centres are summarized in Table 1.

The average daily outdoor play duration in winter and non-winter months is presented for toddlers and preschoolers in Figure 1 and 2, respectively. The median category for toddler outdoor play duration was 30-44 minutes in the winter months and 75-89 minutes in the non-winter months. Whereas, the median category for preschooler outdoor play duration was 45-59 minutes and 90-119 minutes in the winter and non-winter months, respectively. The percentage of centres meeting the best practice for outdoor play duration (toddlers ≥60 minutes/day; preschoolers: ≥90 minutes/day) was significantly different between winter and non-winter months for toddlers (24.9% vs 79.2%) and preschoolers (14.6% vs 55.7%). The average daily frequency of outdoor play sessions in winter and non-winter months is provided in Figure 3 and 4 for toddlers and preschoolers, respectively. The median category for toddler outdoor play frequency was 1 time/day in the winter months and 2 times/day in the non-winter months. Comparably, the median category for preschooler outdoor play frequency was 2 times/day in the winter and non-winter months. The percentage of centres meeting the best practice for outdoor play frequency (≥3 times per day) was also significantly different between winter and non-winter months for toddlers (1.4% vs 11.4%) and preschoolers (3.4% vs 20.2%). Similar significant findings were observed when the cut-off of ≥2 times per day was used for toddlers (43.9% vs 91.4%) and preschoolers (50.2% vs 93.3%).

The associations of demographic, sociocultural, environmental, and policy correlates with meeting the best practice for outdoor play duration for both bivariate and final logistic regression

models are presented in Table 2. For the final models in toddlers, having more than 50% of educators with level 2 (one year certificate) or level 3 (two year diploma or higher) certification, compared to centres with a lower percentage, was associated with a higher likelihood of meeting the duration best practice in winter months (OR= 2.31, 95% CI: 1.15-4.65). In the non-winter months, non-accredited centres or centres in the process of accreditation were more likely to meet the duration best practice compared to centres that were accredited (OR= 5.18, 95% CI: 1.15-23.27). It is important to note that only two centres were categorized as not meeting the best practice for the non-accredited/in-process of accreditation group. Also, each additional unit of outdoor play areas was associated with a higher likelihood of meeting the duration best practice (OR=1.56, 95% CI: 1.09-2.25).

For the final models in preschoolers, as centre location increased in size from rural to large municipality the likelihood of meeting the duration best practice decreased in non-winter months (OR= 0.71, 95% CI: 0.55-0.92). Similar to toddlers, outdoor play areas was a significant positive correlate of duration best practice in preschoolers (OR= 1.41, 95% CI: 1.07-1.84). The portable play equipment variable was removed from the preschool non-winter model due to multicollinearity. No significant associations were found for preschoolers in the winter months.

The associations of demographic, sociocultural, environmental, and policy correlates with meeting the best practice for outdoor play frequency (≥2 times per day) for both bivariate and final logistic regression models are presented in Table 3. In the final toddler models, centres with more than 50% of educators with level 2 or level 3 certification, compared to centres with a lower percentage, were more likely to meet the frequency best practice in the winter months (OR= 2.72, 95% CI: 1.43-5.19). Also, each additional unit of PD frequency was associated with a higher likelihood of meeting the frequency best practice in the winter months (OR= 1.83, 95%

CI: 1.15-2.93). The number of full-time educators and equipment availability variables were removed from the winter final model due to multicollinearity. In the final non-winter model, the policy components variable was removed due to multicollinearity and no significant associations were found.

For the final preschool models, each unit increase of full-time educators was associated with a higher likelihood of meeting the best practice for outdoor play frequency in the winter months (OR= 1.05, 95% CI: 1.01-1.09). Similar to the toddler final model, educator certification was a significant positive correlate of frequency best practice in the winter months (OR= 2.22, 95% CI: 1.20-4.12). Each additional unit of outdoor play areas was also associated with a higher likelihood of meeting the frequency best practice in winter months (OR= 1.34, 95% CI: 1.01-1.80). Due to multicollinearity, four variables including number of total children, portable play equipment, equipment availability, and policy components, were removed from the final model. In the non-winter months, each additional unit of family education topics was associated with a higher likelihood of meeting the frequency best practice (OR= 1.83, 95% CI: 1.04-3.22). The policy component variable was also removed from this model because of multicollinearity.

3.5 Discussion

This study examined outdoor play in toddlers and preschoolers during winter and non-winter months, as well as potential correlates in a large sample of childcare centres. Regardless of age group, a higher percentage of centres met outdoor play duration and frequency best practices in the non-winter compared to non-winter months. In fact, less than a quarter of centres met the duration (toddlers: ≥60 minutes/day; preschoolers: ≥90 minutes/day) and frequency (≥3 times per day) outdoor play best practices for both age groups in the winter months. Even in the non-winter months, less than a quarter of centres met the frequency best practice for both age groups

and only about half of centres met the outdoor play best practices for preschoolers. Correlates of outdoor play duration and frequency varied across age groups and seasons. Across varying models, higher educator certification, more frequent educator PD, more family education topics, and more play areas were most consistently associated with meeting outdoor play best practices.

The finding that duration of outdoor play was low when considering best practice (22) is consistent with the findings of a recent review where an average of 45.2 minutes of outdoor play duration for an average childcare day was observed across 26 studies (27). A novel aspect of the present study was examining the seasonal differences of outdoor play duration. In northern locations such as Alberta, Canada, outdoor play time can be impacted in winter months due to colder temperatures and limited daylight (28). However, childcare is a setting that can maximize outdoor play duration during this season because children typically attend childcare during the warmest and lightest parts of the day. Nevertheless, large differences were observed in duration best practice attainment between winter and non-winter months in both age groups. This finding is consistent with another study in a small sample of North Dakota preschools, where outdoor play time during child care reduced by 60% from fall to winter months (29).

Similar to outdoor play duration, seasonal differences were also observed in the frequency of outdoor play sessions. Increasing outdoor play frequency during childcare has recently been identified as a potential strategy to increase moderate- to vigorous-intensity physical activity (MVPA). For instance, in a sample of 391 Australian children aged 3 to 6 years, one study found that despite spending less total time outside, the intervention group, which played outside 3 times a day during childcare, engaged in significantly more MVPA than the control group which played outside for only 1 session a day (30). Scheduling more frequent shorter outdoor play sessions during the winter in northern climates can have safety benefits;

however, it can also come with barriers due to the time required for dressing and undressing children in winter clothing.

Interventions to increase outdoor play time and frequency in childcare centres are needed, especially in the winter months. To design effective interventions, it is important to understand the correlates of outdoor play duration and frequency in childcare centres (31). Findings from the present study suggest that correlates of outdoor play in the child care setting are multifaceted and differ across age groups and seasons. Multiple associations that were moderate in magnitude (32) were observed between educator's certification and meeting the duration and frequency best practice in the winter months. No previous research to our knowledge has examined the association of children's outdoor play with educator certification, however, studies have examined the association of educator's education and children's physical activity levels. For example, one study found that young children were more active on playgrounds when attending a preschool with a majority of college-educated teachers compared to children at preschools with fewer college-educated teachers (33). This increase in physical activity may be attributed to educator's confidence in facilitating physical activities based on their training (34). Similarly, more education may allow teachers to be more knowledgeable on the importance of outdoor play especially in winter months, as well as more confident in leading children through outdoor activities in winter conditions. A few other associations were observed between centre demographic variables and outdoor play duration and frequency in the final models, however, these observed associations were less consistent and tended to be small in magnitude or impacted by a small sample size for a response category.

For sociocultural correlates, a number of associations were observed with meeting the frequency best practice in bivariate models, however, few variables remained significant in the

final models. For instance, educator PD topics and family education topics were significant positive correlates in all four bivariate models. However, family education topics only remained significant in the final preschool non-winter model. Additionally, educator PD frequency was a significant positive correlate in both toddler and preschool winter models but only remained significant in the final toddler model. The two associations that were observed in the final models were moderate in magnitude (32). To our knowledge this is the first study to examine sociocultural correlates of children's outdoor play. However, there are some studies that have reported a positive association between PD sessions or specific training and children's physical activity in childcare settings (35-37). Similar to increased certification, PD frequency may be especially important for the winter months due to increased challenges associated with outdoor play in winter conditions. Previous studies have found that outdoor play may not be highly valued by parents and educators (38, 39). Therefore, increasing education for both stakeholder groups may cause a shift in these values and increase buy-in, thus increasing a centre's likelihood to meet the best practices.

In terms of environmental correlates a number of weak to moderate associations (32) were observed between the number of outdoor play areas and meeting best practice outdoor duration and frequency. Increased play areas may allow children to move freely and engage in more activities and therefore play outside longer. Future research should consider assessing the quality of play areas and the different types of play areas in the winter and non-winter months to better inform recommendations on designing outdoor play areas in child care settings.

Lastly, the vast majority of centres reported having a written outdoor play policy. Comparatively, in a large sample of Canadian childcare centres, a recent study found 63% of centres had a written policy for children's outdoor play time (40). In the present study, having an

outdoor play policy was not associated with meeting the best practices for outdoor play. However in a study of 50 childcare centres in North Carolina, having an outdoor play time policy was found to be associated with less observed outdoor playtime (41). The authors suggested this may be due to a lack of translation from policies to practices, and that training and education around the policies may be key for policy adherence. Furthermore, the actual content of the policy may be important to consider, as some may be restrictive (e.g., weather-related policies) (42). The present study did consider the number of outdoor play policy components, which included different content, and a number of positive associations were observed in bivariate models for frequency best practice, however this variable had to be removed in final models due to multicollinearity with other variables. This may be due to the fact that some of the policy components (e.g. outdoor play PD for educators, education for families on outdoor play) overlapped with other correlates.

A strength of this study was the large sample of childcare centres from various regions across the province of Alberta, Canada. The response rate of this study was 27% which aligns with other online-based survey research (43), however, it is possible that centre directors who participated in this study placed a higher value on outdoor play than non-participants. Consequently, our descriptive results regarding outdoor play duration and frequency may have been overestimated. As with most questionnaires, the threat of social desirability and recall bias was a limitation. However, because directors reported total outdoor play time and frequency, opposed to specific active play or teacher led play, they likely reported the duration and frequency from their centres daily schedule, therefore limiting recall bias. Finally, due to the cross-sectional nature of the study, causal conclusions cannot be made regarding our findings on the correlates of outdoor play duration and frequency.

3.6 Conclusion

Toddlers and preschoolers in this large sample of childcare centres played outdoors longer and more frequently in non-winter months, compared to winter months. In final models, few significant associations were found between correlates and outdoor play duration and frequency. However, the associations that were observed tended to differ across seasons and age groups, which may be important to consider in future interventions. Overall, educator certification and PD, family education, and play areas may be promising targets. Given the limited evidence in this area, further studies are needed to confirm and strengthen the findings of outdoor play correlates in childcare settings.

Abbreviations

CI: Confidence interval

Go NAP SACC: Go Nutrition and Physical Activity Self-Assessment for Child Care

MVPA: Moderate- to vigorous-intensity physical activity

OR: Odds ratio

PD: Professional development

VIF: Variance inflation factor

Declarations

Ethics approval and consent to participate

Ethics approval was granted from the University of Alberta Research Ethics Board (Pro00080678). All participating directors provided written informed consent.

Consent for publication

Not applicable

Availability of data and material

The data set for the current study is available from the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

Funding

The research was funded internally by the Faculty of Kinesiology, Sport, and Recreation at the University of Alberta. MP is supported by Canadian Institutes of Health Research (CIHR)-Frederick Banting and Charles Best Canada Graduate Scholarship-Master's Award. VC is supported by a CIHR New Investigator Salary Award.

Authors' contributions

MP and VC conceived and designed the study. MP oversaw the study and was responsible for data analysis, interpretation, and drafting the manuscript. VC assisted in data interpretation and writing of the paper. NH critically revised the manuscript for important content, and all authors read and approved the final manuscript.

Acknowledgements

We would like to thank all childcare centre directors for taking time to complete the questionnaire.

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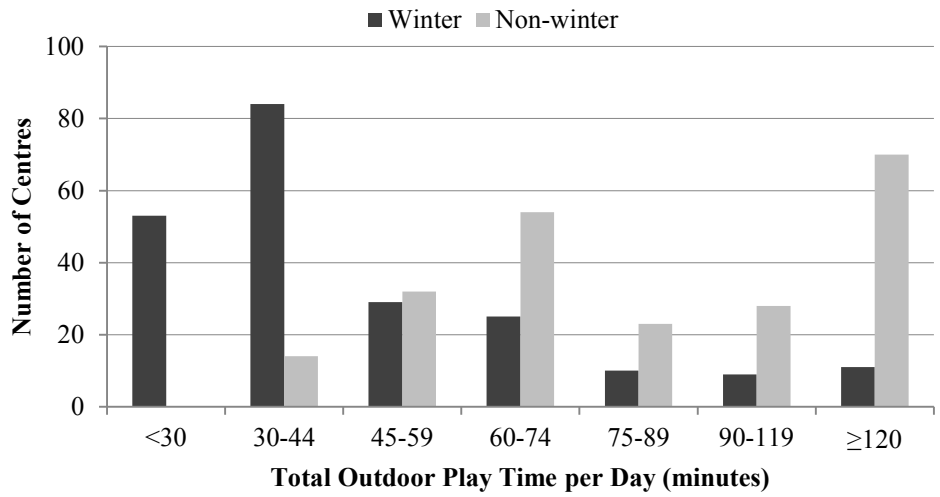

Figure 1: Outdoor play duration of toddlers in winter (December- March) and non-winter months (April-November) (n=221)

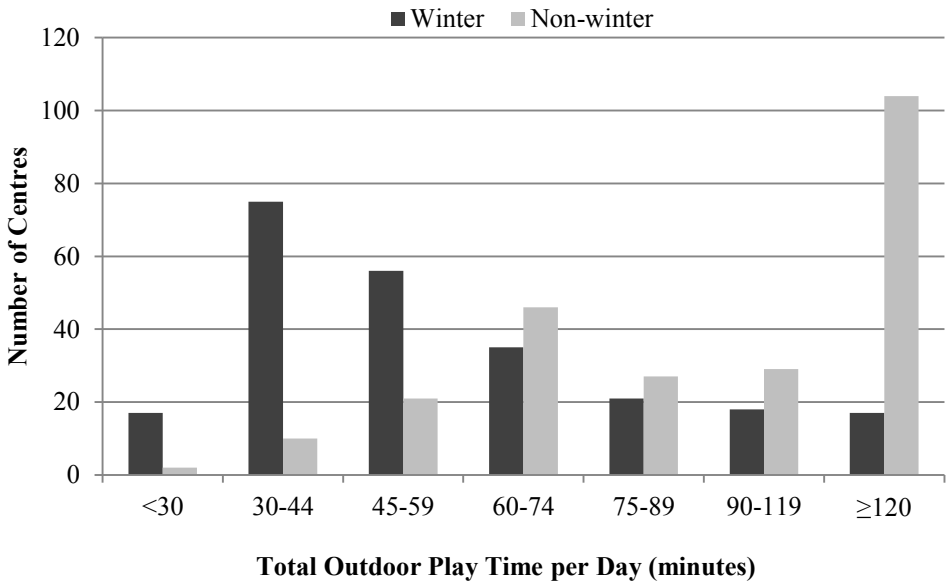

Figure 2: Outdoor play duration of preschoolers in winter (December- March) and non-winter months (April-November) (n=239)

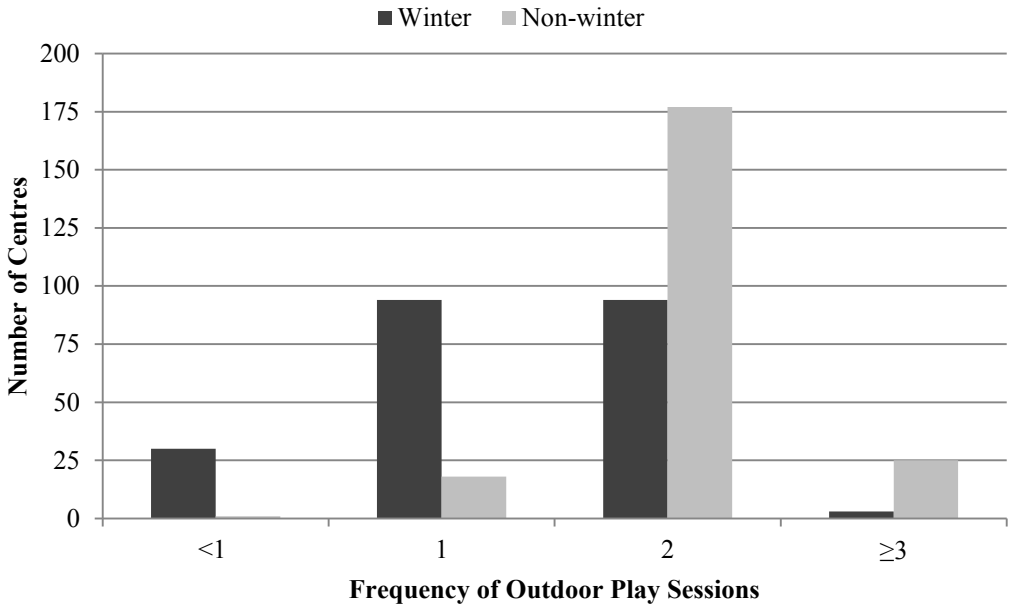

Figure 3: Outdoor play frequency of toddlers in winter (December-March) and non-winter months (April-November) (n=221)

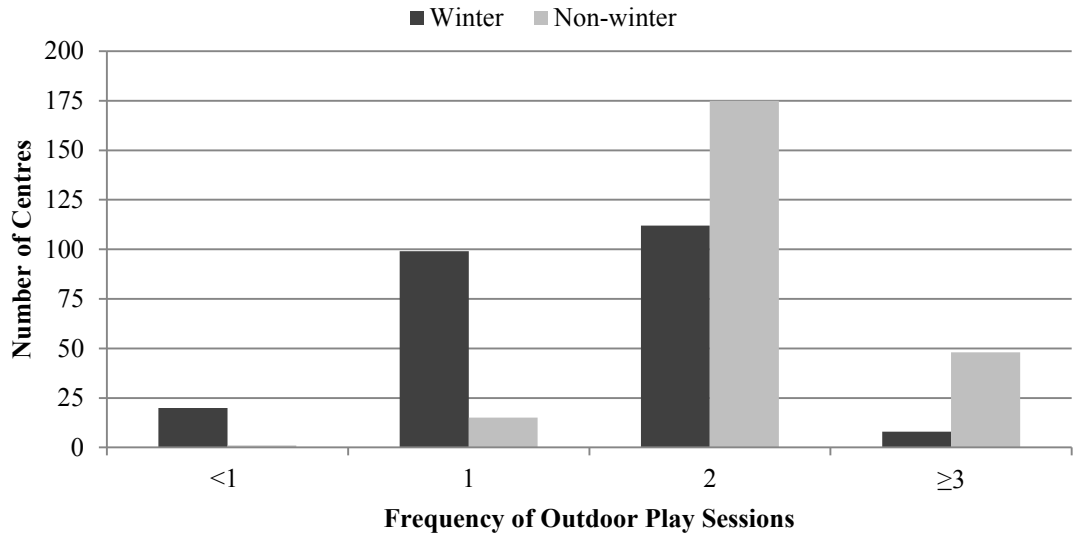

Figure 4: Outdoor play frequency of preschoolers in winter (December-March) and non-winter months (April-November) (n=239)

Table 1: Descriptive characteristics (n=240)

Item	Mean ± SD or n(%)
Centre Demographics	
Children	
Toddler	15.2 ± 14.0
Preschooler	24.3 ± 17.4
Centre total	61.2 ± 43.5
Educators	
Part-time	2.5 ± 2.7
Full-time	11.2 ± 7.7
Staff Certification	
Level 1	4.7 ± 3.2
Level 2	2.3 ± 2.4
Level 3	6.1 ± 5.7
Accreditation Status	
Not accredited	5(2.1)
In process	35(14.6)
Accredited	200(83.3)
Centre Location	
Rural	28(12.0)
Small	52(21.7)
Medium	59(24.6)
Large	100(41.7)
Sociocultural	
PD Frequency	
Never	17(7.1)
<1 time per year	48(20.0)
1 time per year	122(50.8)
≥2 times per year	53(22.1)
PD Topics	
None	19(7.9)
1 topic	30(12.5)
2-3 topics	104(43.3)
≥4 topics	87(36.3)
Family Education Frequency	
Never	62(25.8)
<1 time per year	38(15.8)
1 time per year	67(27.9)
≥2 times per year	73(30.4)
Family Education Topics	
None	47(19.6)
1 topic	43(17.9)
2 topics	58(24.2)
≥3 topics	92(38.3)

Item	n(%)
Environmental	
Outdoor Space	
None	0(0.0)
Some children	20(8.3)
Most children	59(24.6)
All children	161(67.1)
Toddler Play Areas	
1-2 areas	40(18.1)
3-5 areas	80(36.2)
6-7 areas	57(25.8)
≥8 areas	44(19.9)
Preschooler Play Areas	
1-2 areas	32(13.4)
3-5 areas	74(31.0)
6-7 areas	68(28.5)
≥8 areas	65(27.2)
Portable Play Equipment	
None	0(0.0)
1-2 types	6(2.5)
3-5 types	50(20.8)
6-8 types	184(76.7)
Equipment Availability	
Rarely/Never	4(1.7)
Sometimes	19(7.9)
Often	62(25.8)
Always	155(64.6)
Amount of Equipment	
Very limited	3(1.3)
Limited	16(6.7)
Somewhat limited	43(17.9)
Not limited	178(74.2)
Policy	
Outdoor Play Policy	
Yes	226(94.2)
No	14(5.8)
Policy Components	
None	15(6.3)
1-2 topics	14(5.8)
3-5 topics	132(55.0)
≥6 topics	79(32.9)

Table 2: Bivariate and multiple logistic regression analyses for the correlates of meeting the best practice for outdoor play duration (Toddlers: ≥60 min/day; Preschoolers: ≥90 min/day)

	Toddler Winter		Toddler Non-winter		Preschool Winter		Preschool Non-winter	
Predictor	Bivariate OR (95% CI)	Final OR (95% CI)	Bivariate OR (95% CI)	Final OR (95% CI)	Bivariate OR (95% CI)	Final OR (95% CI)	Bivariate OR (95% CI)	Final OR (95% CI)
Centre Demographics								
No. Toddlers	1.01 (0.98-1.03)	-	0.98 (0.96-1.01)	-	n/a	n/a	n/a	n/a
No. Preschoolers	n/a	n/a	n/a	n/a	1.01 (0.99-1.03)	-	1.00 (0.98-1.01)	-
No. Total Children	1.00 (0.99-1.01)	-	***0.99 (0.99-1.00)***	1.00 (0.99-1.00)	1.00 (0.99-1.01)	-	1.00 (0.99-1.01)	-
No. Part-time Educators	1.03 (0.92-1.14)	-	0.96 (0.86-1.07)	-	0.98 (0.84-1.13)	-	1.00 (0.90-1.10)	-
No. Full-time Educators	1.01 (0.98-1.05)	-	0.97 (0.94-1.01)	-	1.02 (0.97-1.06)	-	0.99 (0.96-1.03)	-
≥50% of Educators with Level 2/3 Certification	**2.30 (1.15-4.60)**	**2.31 (1.15-4.65)**	***0.53 (0.26-1.09)***	0.71 (0.33-1.52)	1.30 (0.60-2.79)	-	0.66 (0.39-1.13)	-
Accreditation Status								
Not accredited/ In process	0.66 (0.27-1.60)	-	***5.50 (1.27-23.79)***	**5.18 (1.15-23.27)**	1.59 (0.66-3.82)	-	1.82 (0.89-3.74)	-
Accredited	ref	-	ref	ref	ref	-	ref	-
Centre Location	1.12 (0.83-1.50)	-	0.78 (0.56-1.08)	-	0.88 (0.63-1.23)	-	**0.73 (0.57-0.94)**	**0.71 (0.55-0.92)**
Sociocultural								
PD Frequency	***1.47 (0.99-2.17)***	1.47 (0.99-2.20)	1.21 (0.82-1.77)	-	1.45 (0.91-2.31)	-	0.99 (0.73-1.35)	-
PD Topics	1.06 (0.83-1.36)	-	0.91 (0.70-1.20)	-	1.18 (0.86-1.63)	-	1.07 (0.88-1.32)	-
Family Education Frequency	0.97 (0.75-1.26)	-	0.96 (0.72-1.26)	-	1.16 (0.84-1.58)	-	1.04 (0.84-1.30)	-
Family Education Topics	0.96 (0.74-1.25)	-	***0.77 (0.57-1.05)***	0.78 (0.55-1.11)	1.15 (0.83-1.59)	-	***1.21 (0.97-1.52)***	1.21 (0.95-1.53)
Environmental								
Outdoor Space	1.02 (0.63-1.66)	-	0.82 (0.48-1.41)	-	1.04 (0.59-1.84)	-	0.78 (0.52-1.17)	-
Play Areas†	1.12 (0.83-1.52)	-	**1.44 (1.02-2.01)**	**1.56 (1.09-2.25)**	1.17 (0.82-1.67)	-	**1.47 (1.13-1.90)**	**1.41 (1.07-1.84)**
Portable Play Equipment	1.25 (0.63-2.46)	-	0.79 (0.38-1.64)	-	2.03 (0.80-5.17)	-	***1.69 (1.00-2.87)***	*
Equipment Availability	1.34 (0.84-2.14)	-	0.98 (0.62-1.54)	-	1.52 (0.83-2.78)	-	1.15 (0.81-1.65)	-
Amount of Equipment	1.00 (0.63-1.57)	-	1.07 (0.67-1.73)	-	1.47 (0.76-2.84)	-	1.05 (0.71-1.54)	-
Policy								
Outdoor Play Policy	0.99 (0.25-3.81)	-	**	-	2.12 (0.27-16.88)	-	0.77 (0.25-2.44)	-

Policy Components	0.96 (0.65-1.42)	-	**0.56 (0.34-0.93)**	0.68 (0.39-1.19)	0.88 (0.56-1.37)	-	0.88 (0.63-1.22)	-

Note:
Statistically significant associations **(p<0.05)** are highlighted in bold.
Statistically significant associations ***(p<0.10)*** in bivariates are bold italicized.
Dashes (-) indicate variables that were not included in the final model.
† Models used respective toddler or preschool area totals.
* Variable not included in final model due to multicollinearity.
** Logistic regression could not be calculated due to cell count of 0.

Table 3: Bivariate and multiple logistic regression analyses for the correlates of meeting the best practice for outdoor play frequency (≥2 times/day)

	Toddler Winter		Toddler Non-winter		Preschool Winter		Preschool Non-winter	
Predictor	Bivariate OR (95% CI)	Final OR (95% CI)	Bivariate OR (95% CI)	Final OR (95% CI)	Bivariate OR (95% CI)	Final OR (95% CI)	Bivariate OR (95% CI)	Final OR (95% CI)
Centre Demographics								
No. Toddlers	***1.02 (1.00-1.05)***	1.01 (0.98-1.05)	1.04 (0.99-1.10)	-	n/a	n/a	n/a	n/a
No. Preschoolers	n/a	n/a	n/a	n/a	1.01 (1.00-1.03)	-	1.01 (0.97-1.04)	-
No. Total Children	***1.01 (1.00-1.02)***	1.00 (0.99-1.01)	1.01 (0.99-1.02)	-	***1.01 (1.00-1.02)***	*	1.01 (0.99-1.03)	-
No. Part-time Educators	1.03 (0.93-1.14)	-	0.96 (0.83-1.11)	-	0.99 (0.90-1.09)	-	0.95 (0.81-1.12)	-
No. Full-time Educators	***1.04 (1.00-1.08)***	*	1.04 (0.96-1.12)	-	***1.06 (1.02-1.11)***	**1.05 (1.01-1.09)**	1.08 (0.98-1.19)	-
≥50% of Educators with Level 2/3 Certification	***2.92 (1.63-5.25)***	**2.72 (1.43-5.19)**	***2.54 (0.98- 6.60)***	2.54 (0.89-7.27)	***2.17 (1.26-3.71)***	**2.22 (1.20-4.12)**	***2.37 (0.85- 6.62)***	2.34 (0.72-7.63)
Accreditation Status								
Not accredited/ In process	0.64 (0.31-1.34)	-	0.73 (0.23-2.35)	-	0.88 (0.44-1.73)	-	0.86 (0.23-3.18)	-
Accredited	ref	-	ref	-	ref	-	ref	-
Centre Location	**1.41 (1.09-1.84)**	1.13 (0.84-1.52)	1.11 (0.71-1.71)	-	***1.27 (0.99-1.61)***	1.05 (0.79-1.40)	***1.51 (0.95-2.40)***	1.28 (0.74-2.20)
Sociocultural								
PD Frequency	**1.88 (1.32-2.69)**	**1.83 (1.15-2.93)**	1.26 (0.73-2.17)	-	**1.86 (1.33-2.59)**	1.47 (0.95-2.26)	1.59 (0.89-2.83)	-
PD Topics	**1.30 (1.04-1.63)**	1.08 (0.79-1.46)	**1.44 (1.04-1.00)**	1.26 (0.83-1.90)	**1.42 (1.14-1.77)**	1.25 (0.93-1.67)	**1.49 (1.05-2.11)**	1.23 (0.81-1.87)
Family Education Frequency	***1.25 (0.99-1.57)***	0.94 (0.66-1.32)	1.19 (0.80-1.78)	-	**1.30 (1.04-1.62)**	0.93 (0.66-1.30)	1.29 (0.83-1.99)	-
Family Education Topics	**1.33 (1.05-1.69)**	1.12 (0.78-1.60)	**1.74 (1.16-2.63)**	1.58 (0.95-2.63)	**1.40 (1.11-1.76)**	1.16 (0.83-1.62)	**1.95 (1.22-3.12)**	**1.83 (1.04-3.22)**
Environmental								
Outdoor Space	0.98 (0.64-1.48)	-	1.19 (0.59-2.39)	-	0.95 (0.64-1.41)	-	1.23 (0.59-2.58)	-
Play Areas†	1.07 (0.82-1.40)	-	1.43 (0.87-2.34)	-	**1.36 (1.05-1.76)**	**1.34 (1.01-1.80)**	1.50 (0.90-2.49)	-
Portable Play Equipment	1.26 (0.71-2.24)	-	0.88 (0.31-2.49)	-	**2.26 (1.29-3.97)**	*	1.24 (0.48-3.23)	-
Equipment Availability	***1.41 (0.95-2.09)***	*	**1.89 (1.10-3.25)**	1.62 (0.88-3.00)	**1.46 (1.01-2.12)**	*	1.63 (0.90-2.95)	-
Amount of Equipment	1.06 (0.71-1.58)	-	1.06 (0.53-2.10)	-	1.20 (0.81-1.77)	-	1.53 (0.82-2.87)	-
Policy								
Outdoor Play Policy	1.60 (0.47-5.49)	-	2.26 (0.46-11.15)	-	2.37 (0.71-7.93)	-	2.75 (0.56-13.65)	-

Policy Components	1.18 (0.84-1.67)	-	**1.82 (1.08-3.06)**	*	**1.47 (1.04-2.07)**	*	**2.14 (1.23-3.70)**	*

Note:
Statistically significant associations **(p<0.05)** are highlighted in bold.
Statistically significant associations ***(p<0.10)*** in bivariates are bold italicized.
Dashes (-) indicate variables that were not included in the final model.
† Models used respective toddler or preschool area totals.
* Variable not included in final model due to multicollinearity.

Chapter 4: Conclusion

Childcare centres are an important setting for a large number of Canadian children to access outdoor play opportunities. While previous research has examined children's outdoor play duration in childcare centres in several countries (Truelove et al., 2018), only one small Canadian study has been conducted (Vanderloo et al., 2013). Further, many correlates of children's physical activity levels during outdoor play have been identified (Boldemann et al., 2006; Dowda et al., 2009; Sugiyama et al., 2010; Tonge et al., 2016; Trost et al., 2010), however little research exists on the correlates of outdoor play duration and frequency in childcare centres. This thesis addressed these evidence gaps by comprehensively examining outdoor play in a large sample of childcare centres in Alberta, Canada.

It was hypothesized (thesis hypothesis 1) that the majority of centres or 50% of centres would not meet the outdoor play duration best practice. Findings supported this hypothesis in the winter months for both age groups. However, in rejection of this hypothesis, more than 50% of centres met the duration best practice in the non-winter months for both age groups. It is important to note that for preschool children only 56% of centres met this best practice. It was also hypothesized (thesis hypothesis 2) that the majority of centres or 50% of centres would not meet the outdoor play frequency best practice. In support of this hypothesis, the majority of centres did not meet the best practice for outdoor play frequency (≥3 times per day) in both winter and non-winter months for both age groups. Although when the cut-off of ≥2 times per day was used, a large majority of centres met the best practice in non-winter months. Overall, centres provided children with significantly longer and more frequent outdoor play opportunities in the non-winter months, which supports thesis hypothesis 3.

Findings from this study suggest children's outdoor play opportunities in the childcare setting are limited, especially in the winter months. Therefore, interventions aimed at increasing outdoor play opportunities appear warranted. Though previous studies have examined interventions using outdoor play to increase children's physical activity (Alhassan, Sirard, & Robinson, 2007; Razak et al., 2018; Tucker et al., 2017), no studies exist on evaluating interventions aimed at increasing children's outdoor play duration or frequency in the childcare setting. Despite a lack of scientific evidence on effective ways to increase outdoor play in the child care setting, outdoor play initiatives are still occurring in Alberta. For example, in 2016, a childcare centre in Edmonton, Alberta received a grant of $110,000 to increase winter outdoor play for early years children in their centre (The Lawson Foundation, 2013). The program included training from specialized staff in order to enhance educator's knowledge and capacity to facilitate quality outdoor play in winter conditions. As well, the centre's outdoor environment was enhanced by adding features conducive to winter play, such as wind shelters and warming areas, infant snow play areas, ice/snow sculpting areas, and loose parts (The Lawson Foundation, 2013). Unfortunately, this intervention was not evaluated so it is unknown if these strategies were effective in increasing outdoor play in the winter. Additionally, since this grant only targeted one centre, it is unclear whether these types of strategies would be feasible across multiple centres. A provincial outdoor play initiative that exists and is applicable to the childcare setting is the Get Outside and Play Week organized by Get Outside and Play Early Childhood Network (Get Outside and Play Early Childhood Network, 2019). Once again this initiative is not formally evaluated. Therefore, it appears opportunities exist for collaboration between researchers, child care centres, and local and provincial organizations to better understand how to effectively increase outdoor play duration and frequency in the childcare setting.

Measuring correlates of outdoor play provides evidence of promising targets for interventions (Bauman et al., 2002). This thesis examined multiple levels of variables that may influence outdoor play in childcare centres. It was hypothesized that having a written outdoor play policy and a higher number of policy components would be the strongest correlate of meeting outdoor play best practices across seasons and age groups (thesis hypothesis 4). However, having an outdoor play policy was not significantly associated with meeting the duration or frequency best practices, likely due to the fact that almost all participating centres had a policy. Having more policy components was associated with a higher likelihood of meeting the outdoor play frequency best practice in most bivariate models. However, this variable was removed from final models because of multicollinearity. The multicollinearity was likely due to the fact that the policy components measured various topics that were similar with other correlates measured at other levels of the ecological model (e.g. professional development (PD) for educators and education for families).

The significant correlates of outdoor play duration and frequency varied across age groups and seasons. However, educator certification was relatively consistent across models, suggesting they may be promising targets for intervention. Findings from this study suggested that centres with more than 50% of educators with Level 2 or 3 certification were more likely to meet outdoor play best practices than those centres with less than 50% of educators with Level 2 or 3 certification. In the current childcare landscape, it is likely not feasible for childcare centres to only hire educators with higher levels of certification due to budget constraints of childcare centres and the large number of childcare educators needed to work in the approximately 900 centres across the province. However, based on the importance of outdoor play for early child development, changes could be made to pre-service training to ensure that regardless of

certification level all students learn about outdoor play. Similar to pre-service educator training on physical activity, outdoor play training may increase educator's confidence in implementing quality outdoor play sessions (Martyniuk & Tucker, 2014).

Findings from this thesis also indicate that outdoor play specific professional development for educators and education for families may be important correlates of outdoor play opportunities in childcare centres. This is consistent with previous literature that found increasing educator PD to be effective at increasing young children's physical activity levels (R. A. Jones et al., 2011; Tucker et al., 2017) and fundamental movement skills (R. A. Jones et al., 2011). It is unclear what resources are currently being used for educator PD on outdoor play in Alberta and whether additional resources on specific topics would be desired. This information would be important to determine prior to conducting a future intervention. Previous studies have reported outdoor play to be undervalued by both educators (Copeland, Kendeigh, et al., 2012) and parents (Copeland, Sherman, et al., 2012), though one study found that educators consider outdoor play more important than parents (Tandon, Saelens, & Copeland, 2016). Overall, these studies support the importance of education for families on outdoor play. However, it is important to acknowledge that family education does have it challenges. For example, working parents who have young children in childcare are often quite busy. Additionally, language or literacy barriers may exist for some families. Therefore, multiple strategies to connect with families (e.g., newsletters, day or evening workshops, resource hand-outs or e-mails) on outdoor play may be needed.

The number of outdoor play areas was also found to be positively associated with best practices across several models. Increasing play areas could be a feasible environmental change made by centres with different shapes and sizes of outdoor space. Especially, considering play

areas do not need to include fixed equipment, which actually may reduce young children's activity levels (Bower et al., 2008; Dowda et al., 2009), but can include portable play equipment (e.g. tricycles) and loose parts (e.g. buckets). In fact, the implementation of portable play equipment has been found to be a cost-effective way to increase physical activity levels in various outdoor environments (Bower et al., 2008; Dowda et al., 2009; Hannon & Brown, 2008). Though not examined in this thesis, the quality and type of play areas may also be important to consider. Outdoor play spaces that have been intentionally designed and include more natural features have previously been found to be positively associated with young children's physical activity levels and cognitive skills (Brussoni et al., 2017). Additionally, some types of play areas may not be ideal in winter months or may encourage sedentary behaviour (e.g. swings, sandboxes). Therefore, further evidence on quality and type of play areas could help provide more specific recommendations to relevant stakeholders.

Recently, outdoor play has gained support from national organizations such as the Council of Chief Medical Officers of Health (2018) and Canadian Public Health Association (2019). As recommended in the Canadian Public Health Association's position statement on unstructured play, stakeholders such as childcare centres and governments must work to improve children's access to unstructured outdoor play (Canadian Public Health Association, 2019). One potential way for provincial/territorial governments to support outdoor play in childcare centres is through the implementation of legislation that specifies outdoor play duration and/or frequency requirements. Although Alberta child care regulations suggest outdoor play opportunities each day, there is currently no legislation on required outdoor play duration or frequency (Government of Alberta, 2016). In comparison, the provinces of Ontario and Nova Scotia have regulations on the duration and frequency of daily outdoor play in childcare centres. Provincial

legislation may be more effective than centre level policy at increasing outdoor play duration and frequency because it would be mandatory in terms of licensing and monitored by licensing officers, making centres more accountable. However, to be most effective, the legislation would still need to be supported by other levels of the ecological framework as previously discussed in this chapter.

Based on the novelty of this thesis, future research should work to confirm and strengthen the findings. The methods used in this study, such as the cross-sectional design and self-report measures enabled the collection of data in a large sample of childcare centres. To strengthen the evidence base, future studies should consider stronger study designs such as longitudinal and experimental designs, as well as objective measures, such as observation tools like the Environment and Policy Assessment and Observation (EPAO) tool (Ward, Mazzucca, McWilliams, & Hales, 2015). Regardless of setting, if outdoor play is to be fully supported by multiple stakeholder groups such as caretakers, health practitioners, and government officials, longitudinal studies are needed to determine the long-term health benefits of outdoor play throughout childhood. This research could inform the development of evidence-based outdoor play time recommendations, similar to the physical activity recommendations in the Canadian 24-Hour Movement Guidelines.

Providing children with outdoor play opportunities in childcare centres is a feasible and cost-effective method for providing children with the many benefits of physical activity (Driediger, Vanderloo, Truelove, Bruijns, & Tucker, 2018), as well as the unique benefits of outdoor play. This thesis contributed novel research in the area of outdoor play in childcare centres. By identifying a shortage of outdoor play opportunities and potential correlates for future interventions, this thesis provides relevant stakeholders with some preliminary evidence to

make informed decisions in the future. For example, this evidence may be used by provincial licensing and accreditation standards to support the implementation of specific outdoor play policies and requirements. Additionally, this evidence may be used by childcare directors and owners in Alberta to make centre level policy and practice changes. Ultimately, these changes may provide early years children with more opportunities to meet the Canadian 24-Hour Movement Guidelines.

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Appendix 1: Director Questionnaire

Outdoor Play and Screen Time:

Practices and Policies in Licensed Childcare Centres in Alberta

Director Questionnaire

Instructions:

Who should complete the questionnaire?

- This questionnaire is for centre directors.
- If you are the director for more than one centre, please complete a questionnaire for each centre.

How do I complete the questionnaire?

- Please take your time and read each question carefully.
- Recruit the help of key staff who are familiar with day-to-day practices.
- Choose the answer that best describes the **full-time toddlers and preschoolers** (approximately aged 19 to 60 months) in your care and the educators of toddler and preschool programs by checking the box provided or writing in the space provided.
- If there is a question that you do not want to answer, you do not have to. Your responses will be kept confidential.

What happens when I am done?

When you have completed the questionnaire, please seal it and place it with the completed consent form in the pre-paid, pre-addressed envelope and mail it back to the study team. (paper copy only)

Or

When you have completed the questionnaire, please select "finish." Please note that if you cannot complete your questionnaire in one session, you can save it and return where you left off at a later time. You will be given an auto-generated return code that you will need to enter when returning to the questionnaire. This code is not emailed to you so you will need to write it down. (online version only)

Thank you for taking part in this important study!

Today's Date: __ __ / __ __ / __ __ __ __
(MM/ DD/ YYYY)

What is your email? _____ (online version only)

Centre Demographics

1. What year did your centre open? _____

2. How many days a week is your centre open? _____

3. What hours is your childcare centre open during the week (e.g., 7:00am to 6:00pm)?

____: ____ to ____: ____

4. How many **children** is your centre licensed for? _____

5. How many **full-time children** are currently enrolled in your program in the following age groups:

a) **Infants (less than 19 months)** _____
b) **Toddlers (19 to 35 months)** _____
c) **Preschoolers (36 to 60 months)** _____
d) **Kindergartners** _____
e) **School aged-children** _____

6. How many **full-time educators** does your childcare centre employ? _____

7. How many **part-time educators** does your childcare centre employ? _____

8. How many educators listed in **questions 6 and 7** have the following certifications (if a staff member has more than one certification, indicate the highest level):

a) Child Development Assistant (former Level 1- orientation course)? _____

b) Child Development Worker (former Level 2-certificate)? _____

c) Child Development Supervisor (former Level 3- diploma or equivalent)? _____

d) Other (Please specify: _____)? _____

9. What is your centre's current accreditation status?

- ○ Not accredited
- ○ In the process of accreditation
- ○ Accredited

10. Where is your centre located?

- ○ Rural area
- ○ Small population centre (population: 1,000 to 29,999)
- ○ Medium population centre (population: 30,000 to 99,999)
- ○ Large urban population centre (population: 100,000 or more)

Outdoor Playtime

Outdoor playtime includes any time that children are outdoors playing.

11. Outdoor playtime is provided to **toddlers (approximately 19-35 months)** in **winter months*:**

- ○ Never
- ○ Less than 1 time per day (1-4 days/week)
- ○ 1 time per day
- ○ 2 times per day
- ○ 3 or more times per day

*Winter months are considered as December to March

12. Outdoor playtime is provided to **toddlers (approximately 19-35 months)** in **non-winter months*:**

- ○ Never
- ○ Less than 1 time per day (1-4 days/week)
- ○ 1 time per day
- ○ 2 times per day
- ○ 3 or more times per day

*Non-winter months are considered as April to November

13. The **total** amount of outdoor playtime provided to **toddlers (approximately 19-35 months) each day** in the **winter months***is:

- ○ Less than 30 minutes
- ○ 30-44 minutes
- ○ 45-59 minutes
- ○ 60-74 minutes
- ○ 75-89 minutes
- ○ 90-119 minutes
- ○ 120 minutes (or 2 hours) or more

*Winter months are considered as December to March

14. The **total** amount of outdoor playtime provided to **toddlers (approximately 19-35 months) each day** in the **non-winter months*** is:

- ○ Less than 30 minutes
- ○ 30-44 minutes
- ○ 45-59 minutes
- ○ 60-74 minutes
- ○ 75-89 minutes
- ○ 90-119 minutes
- ○ 120 minutes (2 hours) or more

*Non-winter months are considered as April to November

15. Outdoor playtime is provided to **preschoolers (approximately 36-60 months)** in **winter months***:

- ○ Never
- ○ Less than 1 time per day (1-4 days/week)
- ○ 1 time per day
- ○ 2 times per day
- ○ 3 or more times per day

*Winter months are considered as December to March

16. Outdoor playtime is provided to **preschoolers (approximately 36-60 months)** in **non-winter months*:**

- ○ Never
- ○ Less than 1 time per day (1-4 days/week)
- ○ 1 time per day
- ○ 2 times per day
- ○ 3 or more times per day

*Non-winter months are considered as April to November

17. The **total** amount of outdoor playtime provided to **preschoolers (approximately 36-60 months) each day** in the **winter months*** is**:**

- ○ Less than 30 minutes
- ○ 30-44 minutes
- ○ 45-59 minutes
- ○ 60-74 minutes
- ○ 75-89 minutes
- ○ 90-119 minutes
- ○ 120 minutes (2 hours) or more

*Winter months are considered as December to March

18. The **total** amount of outdoor playtime provided to **preschoolers (approximately 36-60 months) each day** in the **non-winter months*** is:

- ○ Less than 30 minutes
- ○ 30-44 minutes
- ○ 45-59 minutes
- ○ 60-74 minutes
- ○ 75-89 minutes
- ○ 90-119 minutes
- ○ 120 minutes (2 hours) or more

*Non-winter months are considered as April to November

Outdoor Play: Environment

19. At our centre, an open area for outdoor games, activities, and events is:

- ○ Not available
- ○ Large enough for some children to run around safely
- ○ Large enough for most children to run around safely
- ○ Large enough for all children to run around safely*

*This refers to all children who regularly use the open area together, not necessarily for all the children in the centre. For large centres, this response refers to a space large enough for at least 25 children to run around safely.

20. The outdoor play space for toddler and preschool children includes:

- ○ 1-2 play area(s)*
- ○ 3-5 play areas*
- ○ 6-7 play areas*
- ○ 8 or more play areas*

*Each play area offers different play opportunities. Examples of a play area include a swing set, sandbox, climbing structure, pathway, garden, house or tent, small inflatable pool, easel, or outdoor musical instruments. A play area does not need to be permanent: it can be created by bringing equipment outside.

21. Our program has the following portable play equipment available for toddler and preschool children to use outdoors (check all that apply):

- ○ Jumping toys: jump ropes, jumping balls
- ○ Push-pull toys: wagons, wheelbarrows, bug dump trucks
- ○ Ride on toys: tricycles, scooters
- ○ Twirling toys: ribbons, scarves, batons, hula hoops, parachute
- ○ Throwing, catching, striking toys: balls, beanbags, noodles, and rackets
- ○ Balancing toys: balance beams, plastic “river stones”
- ○ Crawling or tumbling equipment: mats, portable tunnels
- ○ Other "loose parts": sticks, shovels, pales

22. Portable play equipment is available to toddler and preschool children during outdoor active playtime:

- ○ Rarely or never
- ○ Sometimes
- ○ Often
- ○ Always

23. The amount of portable play equipment available to toddler and preschool children during outdoor active playtime is:

- ○ Very limited
- ○ Limited
- ○ Somewhat limited
- ○ Not limited- there is always something available for each child to play with

24. Educators most often take the following role during toddler and preschool children's outdoor physically active playtime:

- ○ They supervise only
- ○ They supervise and encourage physical activity
- ○ They supervise, verbally encourage, and sometimes join in to increase children's physical activity
- ○ They supervise, verbally encourage, and often join in to increase children's physical activity

Outdoor Play: Education and Written Policies

25. How often do Educators and staff receive professional development* on outdoor play?

- ○ Never
- ○ Less than 1 time per year
- ○ 1 timer per year
- ○ 2 times per year or more

*Professional development can include taking in-person or online training. It can also include information presented at staff meetings.

26. If applicable, professional development for staff on outdoor play includes the following topics (check all that apply):

- ○ Recommended amounts of outdoor playtime for young children
- ○ Using outdoor playtime and space to encourage children's physical activity
- ○ Communicating with families about outdoor play and learning
- ○ Our program's policies on outdoor play and learning
- ○ Other

If other, please specify: _____

27. Families are offered education* on outdoor play and learning:

- ○ Never
- ○ Less than 1 time per year
- ○ 1 time per year
- ○ 2 times per year or more

  * Education can be offered through in-person educational sessions, brochures, tip sheets, or your program's newsletter, website, or bulletin boards.

28. If applicable, education for families on outdoor play includes the following topics (check all that apply):

- ○ Recommended amounts of outdoor playtime for young children
- ○ Using outdoor playtime and space to encourage children's physical activity
- ○ Our program's policies on outdoor play and learning
- ○ Other

  If other, please specify: _____

29. Our written policy* on outdoor play includes the following topics (check all that apply):

- ○ We don't have an outdoor play policy
- ○ Total amount of outdoor playtime per day
- ○ Frequency of outdoor play opportunities per day
- ○ Shoes and clothes that allow children to play outdoors in all seasons
- ○ Safe sun exposure for children and staff
- ○ Guidelines for unsuitable weather
- ○ Not taking away outdoor playtime in order to manage challenging behaviours
- ○ Professional development on outdoor play
- ○ Education for families on outdoor play
- ○ Other

  If other, please specify: _____

  *A written policy includes any written guidelines about your program's operations or expectations for educators, staff, children and families. Policies can be included in parent handbooks, staff manuals, and other documents.

Screen Time: Practices and Policies

Screen time includes any time spent watching shows or playing games on a screen. Screens can include televisions; desktop, laptop, or tablets; or smart phones.

30. In our childcare centre, screens are located:

- ○ In every classroom
- ○ In some classrooms
- ○ Stored outside of classrooms but regularly available to children
- ○ Stored outside of classrooms and not regularly available to children
- ○ No screens are available to children

31. For **toddlers (approximately 19-35 months)**, the amount of screen time allowed in our program **per week** is:

- ○ No screen time is allowed
- ○ 1-29 minutes
- ○ 30-59 minutes
- ○ 60-89 minutes
- ○ 90 minutes or more

32. For **preschoolers (approximately 36-60 months)**, the amount of screen time allowed in our program **per week** is:

- ○ No screen time is allowed
- ○ 1-29 minutes
- ○ 30-59 minutes
- ○ 60-89 minutes
- ○ 90 minutes or more

33. Our written policy* on screen time includes the following topics (check all that apply):

- ○ No screen time policy exists
- ○ No screen time policy exists because we do not allow screens
- ○ Amount of screen time allowed
- ○ Types of programming allowed
- ○ Appropriate supervision and use of screen time in classrooms
- ○ Not using screen time as a reward or to manage challenging behaviours
- ○ Professional development on screen time
- ○ Education for families on screen time
- ○ Other

  If other, please specify: _____

  *A written policy includes any written guidelines about your program's operations or expectations for educators, staff, children and families. Policies can be included in parent handbooks, staff manuals, and other documents.

Under federal law, it is necessary that you answer a skill-testing question successfully in order to qualify for a chance to win a prize. If you would like your program to be entered in the draw for one of ten $50 resource/equipment items of your choice, then please answer the following question:
(24 + 16) / 10 = _____ **or** □ I do not want my program to be entered in the draw.

This is the end of the survey. Thank you very much for your participation in this important study!

Appendix 2: Letter of Information and Consent Form

INFORMATION LETTER

Outdoor Play and Screen Time: Practices and Policies in Licensed Childcare Centres in Alberta

Project Lead: Madison Predy, 8840 114 Street, Van Vliet Complex, University of Alberta, Edmonton, AB, T6G 2H9

Dear Childcare Center Director,

This research is being led by Madison Predy and her supervisor Dr. Valerie Carson from the University of Alberta. We are asking for you to participate in this important new research study.

What is this study about? This study is examining outdoor play and screen time among toddlers and preschoolers in childcare centres across Alberta. **Please note: This study will not evaluate individual childcare centres. It will only examine outdoor play and screen time in childcare centres at a provincial level. Names of participating childcare centres and the individual childcare centre data collected will be kept confidential.**

What will participation entail? 1) You will complete a questionnaire. The questionnaire should take 10-15 minutes and can be completed via a secure website online or on a paper copy.

Is my participation voluntary? Yes, you are under no obligation to participate in this study. You should not feel obliged to answer any questions you do not wish to. Even if you agree to participate, you may withdraw from the study without any penalty. Within one month of completing the questionnaire, you can ask to have any collected data withdrawn and not included in the study.

Are there any benefits or risks by participating? There are no anticipated risks or direct benefits. The findings may help provide insight into best practices and whether additional services, training, and resources are needed to support healthy outdoor play and screen time practices in childcare centres in Alberta. At the end of the study, we will provide you with a brief report of the overall findings. These findings may provide your centre with ideas on outdoor play and screen time practices and policies.

What will happen to the information collected? All data collected will be kept confidential. Only the research team will have access to it. The study data will be kept in a secure place for a minimum of seven years. If the data is to be used for other studies, ethics approval will be obtained. The data may also be published in professional journals or presented at scientific conferences, but any such presentations will be of overall findings and will never breach

individual confidentiality. To maintain confidentiality, no names or other identifying information would be included.

Will there be any compensation for the after-school program's participation? At the end of the study, if desired, your childcare centre can be entered into a draw for one of ten $50 resource/equipment items of your choice. The probability of winning the prize is approximately 1 in 90.

What if I have questions or concerns? If you have any questions or concerns regarding this study, please contact the project lead Madison Predy (mpredy@ualberta.ca), or her supervisor, Dr. Valerie Carson (780-492-1004 or vlcarson@ualberta.ca). The plan for this study has been reviewed for its adherence to ethical guidelines by a Research Ethics Board at the University of Alberta. For questions regarding participant rights and ethical conduct of research, contact the Research Ethics Office (780-492-2615). This office has no direct involvement with this project.

Would you like to participate? If you would like to participate please complete this consent form and questionnaire and mail it back to the study team in the pre-paid, pre-addressed envelope provided. There is a copy of the consent form for your records. (paper copy only)

CONSENT FORM

Outdoor Play and Screen Time: Practices and Policies in Licensed Childcare Centres in Alberta

1. I have read the letter of information and have had any questions answered to my satisfaction
2. I understand I will be participating in the study called "Outdoor Play and Screen Time: Practices and Policies in Licensed Childcare Centres in Alberta". I understand that this means I (the childcare centre director) will complete a questionnaire.
3. I understand participation is voluntary and I may withdraw without penalty. I understand that every effort will be made to maintain the confidentiality of the data now and in the future.
4. I am aware that if I have any questions, concerns, or complaints, I may contact the project lead, Madison Predy (**mpredy@ualberta.ca**), her supervisor, Dr. Valerie Carson (780-492-1004 or **vlcarson@ualberta.ca**), or the Research Ethics Office (780-492-2615).

We hope to conduct similar research in the future.
Would you be willing to be contacted for future research? ☐ Yes ☐ No

Centre Name: _____
(optional)

I have read the above statements and freely consent to participate in this research:

Name	Signature	Today's Date (MM/DD/YYYY)