

Child and Parent Perceptions of Sleep Behaviours: Shaping Policy and Practice
Development of School-based Sleep Promotion in Canada

by

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ABSTRACT

Inadequate sleep in school-aged children presents as a public health concern across Canada and internationally. The school and home are critical learning environments where children live, learn, and play and have considerable effects on children's health. As such, interventions that synchronize home-school efforts to improve child health outcomes are more effective than interventions that are limited to one setting. Comprehensive School Health (CSH) is an approach that encourages healthy lifestyle choices and academic achievement in students by connecting the school, home, and community, and is useful as a guiding framework for this research. Given that current school-based sleep promotion programs result in minimal behavioural changes in child and adolescent sleep behaviours, there is a clear need to understand the impact of school-based sleep promotion beyond the school walls. The purpose of this research was to explore the perspectives of students and parents regarding school-based sleep promotion. Qualitative methods were used to (1) examine students' perceptions of their sleep behaviours and determine if/how they acted as change agents and initiated sleep behaviour changes in the home, and (2) explore parents' perspectives on sleep behaviours and how parenting practices facilitated and supported, or acted as a barrier, to healthy sleep behaviours in the home.

Objective 1 used focused ethnography as a method and photovoice, participant observation, and field notes as data generating strategies. Grade 4 and 5 students (n=45) from three APPLE Schools in the Edmonton area of Alberta, Canada participated in photo-taking and one-on-one interviews to select, contextualize, and codify the photos as they related to their perceptions of sleep behaviours. Interviews were audio-recorded and

transcribed verbatim with data collection and latent content analysis occurring concurrently. Results indicated that sleep habits were rooted in the home environment and school experiences shaped positive sleep habits in the home. Overall, students conceptualized sleep as “healthy for your body and brain” and translated sleep information home if they thought it was useful to their family.

Objective 2 used descriptive qualitative as a method and semi-structured interviews, field notes, and reflective journaling as data-generating strategies. Parents of school-aged children (n=25) were recruited from participating APPLE Schools and Alberta Health Services. Interviews were audio-recorded and transcribed verbatim with latent content analysis occurring concurrently. Findings were represented in three themes: parents perceived that sleep was valued and supported, recognized barriers to healthy sleep, and identified schools as allies in promoting sleep.

Knowledge translation (KT) occurred throughout the entire research project. The researcher consulted with grade 4/5 teachers in the participating APPLE Schools to determine the utility of knowledge translation products based upon school needs. Due to the participatory and visual nature of photovoice, a photobook was considered ideal for highlighting student voice. Throughout the photovoice process, the researcher returned to each classroom to review preliminary findings with students who participated and to conduct member checking. Photobooks and school newsletters served to disseminate valuable sleep insight created by students. In addition, the results of this thesis will inform a larger province-wide initiative that aims to disseminate a range of sleep-related KT products. These KT products will be created through direct consultation with key policymakers and knowledge users within relevant policy and practice communities.

This thesis demonstrated that students and parents collectively supported school-based sleep promotion and perceived such initiatives as a viable tool to positively shape child sleep habits in the home. Parents and students recognized that sleep behaviour had diverse implications for child health and academic success, and demonstrated knowledge of healthy sleep practices. Notably, parents and students described how sleep practices were rooted in the home, and parents highlighted the need for home-school collaboration to support student sleep behaviours. This thesis identified the CSH approach as an appropriate framework to foster partnerships between the school and home to develop successful school-based sleep promotion initiatives across Canada.

PREFACE

This Masters thesis is original work produced by Melissa Bird. Ethics approval was received from the University of Alberta Human Research Ethics Board, under the project name “Sleeping soundly: Understanding the translation of sleep promotion at school to sleep behaviours at home” No. Pro00078831. The original ethics approval was obtained February 15, 2018 (with subsequent renewals on January 20, 2019 and December 20, 2019). The project renewal is set to expire on January 20, 2021. Ethics approval to work with students in Edmonton Public Schools (Objective 1, photovoice) was received by the University of Alberta Faculty of Education Cooperative Activities Program on Nov 15, 2018 with subsequent amendments throughout 2019 to recruit parents in an additional 5 APPLE Schools (Objective 2).

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LIST OF ABBREVIATIONS

24-Hour Movement Guidelines: The Canadian 24-Hour Movement Guidelines for Children and Youth: An Integration of Physical Activity, Sedentary Behaviour, and Sleep
APPLE Schools: A Project Promoting healthy Living for Everyone in schools
CBPR: Community-Based Participatory Research
CHMS: Canadian Health Measures Survey
CIHR: Canadian Institutes of Health Research
CSH: Comprehensive School Health
HEAL: Healthy Eating and Active Living
JCSH: Joint Consortium for School Health
KTE: Knowledge Translation and Exchange
SPH: School of Public Health
SES: Socioeconomic Status
SIRCLE: Settings-based Intervention Research through Changes in Lifestyles & Environments
WCHRI: Women and Children's Health Research Institute

CHAPTER 1: INTRODUCTION

1.1 Overview

This introduction will establish the thesis purpose and outline. Chapter one will illustrate sleep status in Canadian children and the detrimental effects of poor sleep on children's health and academic success. As well, this chapter will demonstrate that Comprehensive School Health (CSH) is a viable health promotion strategy to address child sleep issues. The school-based health promotion intervention 'A Project Promoting healthy Living for Everyone in Schools' (APPLE Schools) will be introduced as an ideal setting to understand the translation of school learned sleep promotion to the home environment. This introduction will also provide an overview of research objectives, thesis organization, and attributions.

1.2 Sleep Behaviour in Canadian Children and School-based Health Promotion

Sleep is essential for a child's healthy development; however, global trends indicate a decline in children's sleep duration (Matricciani et al., 2017). The ParticipACTION Report Card (2020) is a national report that compares national-level survey information with comprehensive literature reviews to assess the status of Canadian child health behaviours, including sleep, and has recently identified that Canadian children's sleep has worsened over the past 2 years (ParticipACTION, 2018; ParticipACTION, 2020). Currently, 30% of Canadian children are not meeting sleep recommendations and may suffer adverse health outcomes (ParticipACTION, 2020). Sleep is strongly associated with a range of physical and psychosocial outcomes, including metabolism regulation, insulin sensitivity, emotional/stress management, alertness, memory, attention, and

productivity (Carson et al., 2017; Gilad & Shapiro, 2020; Hanlon et al., 2019; Saunders et al., 2016; Sparano et al., 2019). Children who sleep well benefit from increased self-esteem, social competence, and peer relations (Saunders et al., 2016; Shochat et al., 2013; Thumann et al., 2019). As well, children are likely to experience negative academic consequences as a result of poor sleep; children with sleep disorders experience reduced attention, memory, intelligence, and problematic behaviour that may affect their school performance (Faught et al., 2017; Rey et al., 2020). Sleep is undoubtedly essential to meet everyday life demands. Thus, inadequate sleep is a public health issue that requires recognition as it affects a child's health, well-being, and future success.

Both the home and school environments are critical settings for child-focused health promotion interventions as children spend the majority of their time in these environments (Bates et al., 2018; Rhodes et al., 2020; Salinas & Epstein, 2004). The behavioural effects of insufficient sleep on children are evident both at home and school as parents must cope with the demands of a sleepless child, while teachers routinely observe the effects of sleep deprivation in the classroom (Amschler & McKenzie, 2005; Rensen et al., 2019). Indeed, parents and teachers contribute to a child's health, functioning and academic success (Wang & Neihart, 2015). The conceptualization of a "school learning community" serves to merge communication between the school and home – emphasizing the relationships between educators, students, parents, and community partners as central to improving children's health and academic achievement (Salinas & Epstein, 2004). As such, health promotion interventions that are implemented within the home and school environments not only benefit parents and teachers, but give children a greater likelihood of success. Given that sleep is a behaviour that requires

intervention, it is reasonable that investment in sleep promotion initiatives should include both the school and home.

Perspectives of school-aged children are unaccounted for in the literature on school-based sleep promotion initiatives, as previous research primarily focused on high school aged or adolescent participants (Cassoff et al., 2013; Gruber, 2017). A sizable amount of literature is dedicated to understanding the effects of pubertal development on sleep behaviour in adolescents, however, taking a preventative approach, it is arguably more productive to target the sleep behaviour of school-age children to prevent sleep issues in adolescents (Wolfson & Carskadon, 2003). Indeed, approximately a third of school-age children do not meet Canadian sleep recommendations (Participation, 2020), while self-reporting of child sleep tends to be overestimated by caregivers (Lauderdale et al., 2008; Prokasky et al., 2019). Thus, from a public health standpoint, school-based sleep promotion initiatives that aim to improve the sleep behaviour of school-aged children are needed, but lacking in the current literature.

More so, school-based sleep promotion initiatives that have targeted school-aged children have not yielded promising results towards positive sleep behaviour changes (Gruber, 2017). Alternatively, school-based health promotion initiatives that target physical activity and eating practices are well-documented within the literature and have been shown to improve student diet (including fruit and vegetable consumption), activity and fitness levels, body weight, as well as healthy-living knowledge, behaviour, and attitudes (Fung et al., 2012; Langford et al., 2014). A considerable limitation exists in our current understanding of school-based sleep promotion, and if this is a health behaviour that can be promoted at school to support improvements in sleep behaviours at home.

Perhaps most importantly, the majority of school-based sleep promotion initiatives that involve school-aged children do not go past the school walls. Interventions are typically established through classroom instruction, with minimal parental involvement (Gruber, 2017). It is promising that a few studies have involved parents in their program through educational seminars/videos (Bonnar et al., 2015; Wing et al., 2015). Understanding the link between the school and home can result in informed sleep promotion initiatives that support student sleep behaviours. Emerging research emphasizes that understanding how physical activity and healthy eating behaviours are carried out in the home is essential in refining school-based health promotion initiatives (McKernan et al., 2019). The purpose of this research is to bridge our understanding of school-based sleep promotion across the school and home environments. Both the child and parent perspective are essential in understanding these transitions, and will be explored throughout independent sections of this paper.

1.3 Comprehensive School Health in Canada and APPLE Schools

The Comprehensive School (CSH) approach offers a solution to address sleep concerns in youth to improve education and social outcomes. It has been demonstrated that healthy students have improved learning outcomes and that better-educated individuals are healthier (Faught et al., 2017; Sosso et al., 2019). Thus, student health must be addressed in order to improve educational outcomes and ensure future quality of life. The CSH model encompasses the school, home, and community environments to facilitate healthy lifestyle choices in youth, and is utilized throughout Canada due to its demonstrated success (Fung et al., 2012; Fung et al., 2013; Ofosu et al., 2018). Given

there is minimal research on sleep interventions operating within the CSH framework, this is a novel investigative opportunity.

School-based health promotion initiatives such as APPLE Schools (A Project Promoting healthy Living for Everyone in Schools) have adopted the CSH approach and developed integrated approaches to improving student sleep behaviour. APPLE Schools aims to empower students by providing resources to aid in healthy behaviour development and involves schools throughout Alberta, BC, Manitoba and the NWT (appleschools.ca). The importance of improving sleep behaviour is evident in APPLE campaigns such as ‘Be A Sleep Star’ and ‘Don’t be the Walking Dead,’ which promotes healthy sleep behaviours to students and their families. Therefore, APPLE schools represent an ideal location to understand the impact of school-based sleep promotion on children and, potentially, families. Recent studies have demonstrated that students in APPLE schools apply the healthy lifestyle behaviours they learn at school to the home environment and that children may act as change agents and positively affect their family’s health behaviours (McKernan et al., 2019). Therefore, there is a need to understand if/how students are using school learned sleep information and how this might affect the home environment.

1.4 Rationale

There is significant rationale to explore students’ and parents’ perceptions of sleep and school-based sleep promotion. A search for “school-based sleep education program” using Google Scholar found eight articles published that focused on child populations ~5-13 years (Almondes et al., 2018; Blunden et al., 2016; Chan et al., 2016; Gruber, 2013;

Gruber et al., 2016; Li et al., 2013; Rigney et al., 2015; Rossi et al., 2002). “School-based sleep education programs” and “school-based sleep promotion interventions” are interchangeable terminology, with the former tending to focus on in-class educational components and behavioural change strategies (Cassoff et al., 2013). This thesis will utilize the term “school-based sleep promotion” to refer to interventions that implement CSH or a whole-school approach. A search of “school-based sleep promotion”, “comprehensive school health”, and “school-based health promotion” on Google Scholar yielded only one study in adolescents (Cassoff et al. 2013). The paucity of evidence of school-based sleep promotion interventions that utilize the CSH approach underscores the need for additional data on sleep promotion in schools. The same search found only one study that integrated students, family, community, school staff, and school administrators in the intervention process, thereby integrating components of a CSH approach, and was successful in altering the sleep behaviour of school-aged children (Gruber et al., 2016). Given that current school-based sleep interventions yielded minimal behaviour changes in the home (Cassoff et al., 2013; Gruber, 2017), it is essential to explore factors that determine how sleep promotion learned at school is transferred home. Furthermore, it is necessary to understand the collective perspectives of both students and parents in order to gain insight into sleep behaviours. Indeed, student learnings may translate to the home (McKernan et al., 2019). However, parent’s responsivity to these learnings determine if and how they are implemented within the home (Sormunen et al., 2011), as they strongly impact their child’s sleep behaviour (Acousta et al., 2020). As well, the limited availability of qualitative data pertaining to school-based sleep promotion has led to gaps in current knowledge of contextual factors that affect sleep in the home. It is alarming

that even less research exists within the Canadian context. Thus, gaining a collective understanding of student and parent perception of sleep and school-based sleep promotion is necessary to facilitate successful transitions of sleep promotion at school to the home. As inadequate sleep in children becomes increasingly recognized as a public health issue, this research will provide novel understandings of the intricacies of sleep behaviour in the home, and pathways to support school-based sleep interventions beyond school walls.

1.5 Research Purpose and Objectives

This research is driven by qualitative inquiry and will use focused ethnography as a guiding method to explore student and parent's perspectives regarding school-based sleep promotion. The research objectives of the proposed research are as follows:

Objective 1: To examine children's perceptions of their own sleep behaviour and determine if and how they translate school-based sleep promotion home.

Objective 2: To explore parent's perspectives on sleep behaviours and how parenting practices facilitate and support, or act as a barrier, to their children's healthy sleep behaviours.

1.6 Thesis Attributions

The thesis is a component of my Master of Science in Health Promotion from the University of Alberta School of Public Health (SPH). As much of this work was done in partnership with APPLE Schools, it is important to acknowledge the relationship with

APPLE Schools. Dr. Storey's SIRCLE (Settings-based Intervention Research through Changes in Lifestyles & Environments) Research Lab housed within the SPH has worked in partnership with APPLE Schools over the last 11 years. SIRCLE and APPLE Schools work closely together to establish relationships with students, parents, teachers, and administrators within participating schools. APPLE Schools works to implement health promotion initiatives and recognizes the importance of sleep promotion, proving an ideal setting for the given research project to take place. Academic researchers and knowledge users identified a need to understand the implementation of school-based sleep promotion, and formalized a successful research proposal in 2018 in collaboration with the APPLE Schools management team and key knowledge users. This research proposal was put forward and received funding (CIHR, WCHRI) to investigate student and parent perspectives on sleep behaviour. This project will further our understanding of the implementation of school-based sleep promotion initiatives within the CSH framework.

There is an increased recognition of the importance in exploring the translation of health promotion at school to sleep behaviour at home (McKernan et al., 2019). School-wide health promotion campaigns such as 'Be A Sleep Star' and 'Don't be the Walking Dead' serve to promote sleep in participating APPLE Schools, and are viable opportunities to investigate the translation of sleep promotion at school to the home. The findings of this thesis project will critically inform the planning and implementation of sleep promotion in schools. The first objective of this thesis research (Objective 1) is predicated on prior literature that identified students as change agents who successfully translated HEAL behaviours home (McKernan et al., 2019). The paucity of evidence surrounding the translation of school-based sleep promotion to the home environment

highlighted the need for further investigation of sleep specifically. Objective 1 used focused ethnography as it was useful to gain an understanding of the lived experiences of those living in a discrete community (Cruz, 2013). The approach of focused ethnography proved successful in investigating the translation of HEAL behaviours to the home environment in students in APPLE Schools (McKernan, 2019). Photovoice was an appropriate data generating strategy as it is participatory in nature, useful in child populations to encourage fruitful discussions, and results in visually appealing KT materials.

Objective 2 was formulated from the creation of Objective 1. When investigating sleep behaviour in students, it was integral to understand parent perspectives on sleep behaviours and how parenting practices facilitated and supported, or acted as a barrier, to healthy sleep behaviours in their children. The literature is substantial in acknowledging that both the school and home environments contribute to shaping child health behaviours. Therefore, it was essential to understand the parenting influence and role.

This research project was carried out and completed by myself as original work. With the support and guidance of my supervisor and committee members, I was responsible for proposing the research, generating appropriate research objectives, choosing ideal methods, obtaining ethics approval, conducting data collection, analysis, writing, and presenting the following research at three academic conferences (This is Public Health, 2019; Women and Children's Research Day, 2019; Shaping the Future, 2020). I facilitated each of the sessions with school communities, students, and parents, and was actively involved in all stages of the planning and decision-making processes. As

a result, this thesis presents original data that was developed and conducted in its entirety by myself and my thesis committee.

1.7 Thesis Organization

This paper-based thesis is organized into five chapters. Chapter two provides a thorough review of relevant literature in the scope of the research project, and served to situate the research project within standing literature. This literature review provided an overview of the status, determinants, and outcomes of child sleep health; the role of both school and home environment in impacting child health behaviours; children as change agents within the CSH framework; and significance of the current thesis research. Chapters three and four addressed objectives 1 and 2 respectively, and each addressed the research paradigm, theoretical perspective, and accompanying methods, data generation, analysis, and results. Chapters three and four will each be submitted as individual manuscripts for publication. Chapter five summarized the research findings, implications, and further directions of this research. References and appendices are located at the end of the thesis.

CHAPTER 2: LITERATURE REVIEW

School-aged children (ages 5-11) require sleep for emotional, behavioural, and physical development (Dutil et al., 2018; Hysing et al., 2016), however, 30% of Canadian children are not meeting national recommendations and may suffer adverse health outcomes as a result (Hanlon et al., 2019; Michaud & Chaput, 2016). To improve child sleep, it is important to consider the influence of environments where children live, learn, and play. Specifically, the home and school environments have considerable effects on child health and are ideal sites for intervention (Epstein, 2018; Knowlden & Sharma, 2012). In addition, interventions that foster relationships between the home and school are effective in improving child health outcomes (Salinas & Epstein, 2004). The purpose of this literature review is to establish the need to address child sleep status in Canada, and to highlight the role of the home, school, and neighbourhood in shaping child sleep. This section will establish rationale for the viability of school-based sleep promotion interventions as an effective strategy to improve child sleep behaviours.

2.1 Sleep Behaviour in Canadian Children

It is well-established that children require sleep for healthy development, as well as for positive physical and psychosocial outcomes (Dutil et al., 2018). Assessments of child sleep within Canada have found that 30% of Canadian children and youth aged 5-17 years do not meet current sleep recommendations (ParticipACTION, 2020). Furthermore, the use of self-reports rather than direct observational data to assess child sleep status may obscure the pervasiveness of inadequate sleep in Canadian children (ParticipACTION, 2018; Lauderdale et al., 2008; Prokasky et al., 2019). These statistics warrant the need for public health interventions to address child sleep behaviour in the

Canadian population. The aim of this section is to highlight current sleep issues in Canadian children by comparing current child sleep status to national recommendations, and to demonstrate the detrimental effects of inadequate sleep on school-aged children.

2.1.1 Canadian sleep recommendations and child sleep status

It is essential to assess child sleep status in order to determine the prevalence of sleep issues in Canadian children. However, there are limitations in assessing child sleep behaviour that may lead to an underestimation of the extent of child sleep issues in Canada. Sleep behaviour is historically difficult to assess as it cannot be observed in the home and cannot be objectively measured in large populations; thus, it is generally assessed through subjective reporting. Data that is collected through the Canadian Health Measures Survey (CHMS) is generally from self- or proxy reports and subject to recall and social desirability bias (ParticipACTION, 2018). These biases may lead to an overestimation of child sleep duration by both parents and children (Prokasky et al., 2019). One study suggested that children tended to over-report their sleep duration. Results indicated that children self-reported 9.2 hr/night while actigraphy measurements indicated they only slept for 7.9 hr/night (Tremaine et al., 2010). In addition, under-reporting of sleep issues in Canadian children may contribute to underestimations of child sleep issues. Child sleep issues tend to be reported differently across cultures as parental awareness and knowledge of sleep behaviour varies (Owens, 2005; Tremblay et al., 2016). Lack of access to physicians also decreases the likelihood of parents reporting of child sleep issues (Gruber et al., 2014). In summary, overestimations of child sleep duration paired with under-reporting of child sleep issues poses a barrier to public

awareness of child sleep issues, and may conceal the extent of sleep issues in Canadian children.

Increased concerns about child health status, including sleep, has resulted in the development of The Canadian 24-Hour Movement Guidelines for Children and Youth: An Integration of Physical Activity, Sedentary Behaviour, and Sleep (2016). The 24-Hour Movement Guidelines are the current source of sleep recommendations for Canadian children and youth, and are built upon strong evidence of cardiometabolic, anthropometric, and mental benefits of sleep (Tremblay et al., 2016). However, the lack of evidence-based research is problematic when attempting to synthesize sleep recommendations (Chaput, 2016), and extensive recommendations for sleep characteristics that include sleep duration, quality, timing, variability, and hygiene have yet to be established (ParticipACTION, 2018). Currently, it is recommended that children aged 5-13 years sleep uninterrupted for 9-11 hours each night, with consistent bed and wake-up times. While these guidelines are an important step towards addressing child sleep concerns and provide a benchmark for children's sleep in Canada, a combination of public health strategies are required to comprehensively investigate and continue to support child sleep in Canada.

When comparing children's sleep against the 24-Hour Movement Guidelines, it is important to recognize that children have unique sleep needs, and children may require differing amounts of sleep based on their age and unique physiology. Declines in sleep duration are most prominent as children enter adolescent developmental periods and experience physiological maturation, leading to alterations in circadian rhythm and delayed melatonin release (Grandner, 2019). However, there is evidence that children's

sleep needs change prior to adolescence. As children progress through their primary school years they begin to establish regular sleep-wake patterns and have a decreased need for daytime napping (Owens & Ordway, 2019). As a result of social and biological influences, children tend to get less sleep as they age; Sadeh et al. (2000) found that children in the second grade slept an hour more than children in the sixth grade. Children have been observed to sleep in on the weekends starting as early as 4 years old and may have bed/wake times during the week that do not align with their circadian rhythm, causing health detriments from a young age (Clara & Allen Gomes, 2020; Stoner et al., 2018; Touchette et al., 2008). Although children have unique sleep needs, the 24-Hour Movement Guidelines act as a benchmark from which to assess sleep status.

Alarmingly, data collected from the CHMS indicated that approximately 30% of children aged 5-17 were not meeting the 24-Hour Movement Guidelines, and may experience adverse health outcomes as a result (Michaud & Chaput, 2016). Child sleep information collected from the CHMS (2014-15) provided additional insight into child sleep issues. From the results of the CHMS (2014-15), it was determined that 5-11-year-olds slept an average of 9.7 hours each night. As well, approximately 33% of children aged 5-13 had trouble going to sleep or staying asleep, 12% found it challenging to stay awake during regular waking hours, while 10% did not find their sleep refreshing, at least some of the time (Chaput et al., 2017; ParticipACTION, 2018). Furthermore, recent data released within the ParticipACTION Report Card (2020) suggested that child sleep in Canada is declining; the percentage of children meeting sleep recommendations decreased from 75% to 70% throughout 2018-2020. Given that adult sleep trends are equally concerning, it is essential that a preventative approach is taken to address child

sleep concerns in order to prevent further sleep problems. It is concerning that a portion of Canadian children are not meeting the guidelines and may experience recurrent sleep issues, causing adverse health outcomes that progress into adulthood (Dutil et al., 2018; Morrissey et al., 2020). Overall, the proportion of children not meeting sleep recommendations and experiencing sleep issues warrants the development of effective child sleep interventions to address this public health issue.

2.1.2 Inadequate sleep and child health

Inadequate sleep in Canadian children is a public health concern; it is well established that children with poor sleep experience various detrimental physical and psychosocial outcomes (Tremblay et al., 2016). The literature in this section will not be limited to Canada, but rather, will summarize a wide range of literature to explore general health outcomes as a result of poor sleep in children. This section will demonstrate the consequences of poor sleep on children's health, functioning, and academic performance. Children with poor sleep have a greater likelihood of experiencing a range of adverse emotional, behavioural, and physical outcomes, and may have difficulty with daytime sleepiness and overall functioning. Inadequate sleep may cause children to be more prone to hyperactivity, impulsivity, and emotional outbursts (Alfano et al., 2020; Palmer et al., 2019). In addition, children may experience physical symptoms such as physical aches and pains, and chronic fatigue as a result of poor sleep (Oginska & Porkoski, 2006). Excessive daytime sleepiness in children is associated with attention and conduct problems, concentration difficulties, and distractibility (Smedje et al., 2001). As well, children with sleep problems may experience difficulty with emotional regulation (Hysing et al., 2016; Williams et al., 2017). As a result of these difficulties, children may

have social-emotional issues with peer relationships later in life (Larose Grégoire et al., 2018; Williams et al., 2016). Furthermore, inadequate sleep is a significant risk factor for obesity in children. Specifically, short sleep duration has been associated with obesity in children (Morrissey et al., 2020). Other sleep measures, such as sleep quality, sleep disturbance, and delayed sleep onset also negatively affect child sleep (Jarrin et al., 2013). Overall, sleep undoubtedly affects a range of health outcomes in children and drastically impedes a child's ability to be successful in life.

Importantly, inadequate sleep may cause detriments to cognitive functioning such as memory, attention, and learning, and can affect a child's ability to be successful in school. Sleepiness is thought to impact children's ability to remember and process information quickly (Calhoun et al., 2012). It has been established that sleep facilitates memory encoding, working memory, and long-term memory (Kopasz et al., 2009). Children who sleep well benefit from improved concentration and are able to consolidate school learnings (Gais et al., 2006). Overall, it is well-established that sleep affects memory, attention, and learning, and therefore it is likely that inadequate sleep will negatively affect school performance. The effects of poor sleep on child academic performance is reflected within the literature. For example, shortened sleep time, erratic sleep/wake schedules, late bedtimes, sleeping in, and poor sleep quality has been negatively associated with academic performance in children and adolescents (Faught et al., 2017). As well, daytime sleepiness was shown to strongly affect children's performance in school (Dewald et al., 2010), suggesting that children who are tired cannot perform well in school. As child sleep affects a range of health outcomes and school performance, it is understandable that parents, teachers, and school administrators

have a vested interest in addressing child sleep issues to improve their child's quality of life and academic success.

2.2 Home, Neighbourhood, and School effects on Child Sleep

Child sleep behaviours are shaped by the environments in which they live, learn, and play (Grandner, 2019). Indeed, the home, neighbourhood, and school have been investigated for their role in shaping child sleep behaviours (Spilsbury et al., 2005; Bagley et al., 2015; Bowers & Moyer, 2017). The home exerts a strong influence on sleep behaviour through parent-child relationships and parenting practices occurring throughout child development (Owens, 2008; Spilsbury et al., 2005). Moreover, the built environment and family socioeconomic status (SES) of the neighbourhood, as well as school policy, academic commitments, and social relationships have been demonstrated to affect child sleep behaviour (Bottino et al., 2012; Billings et al., 2020; Ren et al., 2017). This section will broadly assess child sleep in a variety of contexts, and is not limited within the Canadian population. The aim of this section is to demonstrate the significant influences of the home, neighbourhood, and school on child sleep. Consequently, changes to these environments may result in positive changes in children's sleep, and thus provide an avenue to address inadequate sleep in Canadian children.

2.2.1 The home environment

The home environment is thought to play a role in shaping student behaviours (Spilsbury et al., 2005). Specifically, parent-child relationship and parenting practices strongly affect child sleep (Acosta et al., 2020). Parent-child relationships that promote warmth and closeness are thought to lead to healthier sleep behaviours in children

(Cimon-Paquet et al., 2019; Eck et al., 2020). As well, parenting practices shape child sleep behaviours; parents who provide a bedtime routine or promote sleep hygiene help improve their children's sleep (Galland & Mitchell, 2010). Family customs and cultural influences also shape parenting practices and sleep behaviour in the home (Acosta et al., 2020; Giannotti & Cortesi, 2009). In sum, this section will identify the various influences that exist within the home environment that shape child sleep behaviour, and establish the rationale towards including the home environment in sleep promotion interventions.

2.2.1.1 Parent-child Relationship

Parent-child relationships significantly affect child sleep behaviour in the home, and considerable amounts of literature speak to the importance of establishing parent-child bonds that foster warmth and closeness in order to improve child sleep. For example, parents who display more emotion and have close bonds with children may promote healthier sleep patterns such as uninterrupted nighttime sleep (Bernier et al., 2013; Cimon-Paquet et al., 2019; Yang et al., 2020). In contrast, parents who are emotionally unavailable to their children may be unable to provide their children with feelings of security, resulting in maladaptations in child sleep (Dahl & El-Sheikh, 2007). Importantly, parents who provide structure and security to their children may positively influence sleep (Gunn et al., 2019). Children's sleep is affected by their relationship with their parents from an early age. In one study, infants with mothers who were emotionally unavailable had sleep difficulties that persisted throughout childhood (Teti et al., 2010). It appears that parent-child relationships strongly affect child sleep starting from infancy and extend throughout childhood.

Parenting styles often underlie the bond that forms between parent and child, and have been demonstrated to affect child sleep behaviour. Parenting styles refer to a “stable complex of attitudes and beliefs that form the context in which parenting behaviours occur” (Brenner & Fox, 1999, p. 344), and are grounded within characteristics of responsiveness and demandingness of the parent towards the child. Parents who are responsive to their children help to shape children’s individuality through providing “warmth, autonomy support, and reasoned communication” (Baumrind, 2005), while parents who exhibit demandingness promote the child’s ability to integrate into a society through their involvement (Baumrind, 2005). Parenting styles range from authoritative, authoritarian, permissive, and neglecting and are classified based on the proportions of demandedness and responsiveness that parents exhibit (Robinson et al., 1995). Overall, the authoritative parenting style (characterized by high demandedness and high responsiveness) is most likely to positively influence a child’s sleep pattern (Flint-Bretler et al., 2013). In one study, parents with authoritative parenting style were found to be more likely to implement healthy bedtime routines for their children (Kitsaras et al., 2018). Alternatively, permissive parental styles may result in unhealthy sleep habits; one study found that the permissive parenting style was associated with increased TV watching in children (Flint-Bretler et al., 2013). It is important to note that a significant amount of literature has investigated the maternal influence on child sleep, and there is less evidence that highlights the impact of other parents or caregivers on child sleep (Cimon-Paquet et al., 2019). However, there are critiques that parenting style may not be universally applicable. There is emerging evidence that questions the validity of applying universal parenting styles across differing cultural, socioeconomic, and ethnic contexts

(Power, 2013). Alternative approaches integrate multiple contextual factors (e.g., parenting practices, child-parent dynamics, individual child characteristics) to address unique familial characteristics and circumstances (Martinez et al., 2019; Sangawi et al., 2015). Specific practices that promote sleep will be explored within the next section.

2.2.1.2 Sleep hygiene

Parents who practice sleep hygiene in the home may improve their children's likelihood of sleeping well (Galland & Mitchell, 2010; Sun et al., 2014). Sleep hygiene refers to creating an optimal environment for sleep and performing practices that promote sleep (Jan et al., 2008). The 24-Hour Movement Guidelines recommend that children aged 5-13 sleep uninterrupted for 9-11 hours with consistent bed and wake-up times, while other organizations (e.g. The Public Health Agency of Canada, Canadian Sleep Society, Anxiety Canada) recommend a variety of general sleep tips. This section provides an overview of general guidelines for sleep hygiene formulated by Chaput (2016). These guidelines have been included the ParticipACTION Report Card (2018):

- Going to bed and waking up at the same time everyday
- Avoid caffeine consumption starting in the late afternoon
- Exercise regularly during the day
- Do not go to bed feeling hungry, but also do not eat a heavy meal right before bed
- Expose yourself to bright light in the morning
- Make sure your bedroom is conducive to sleep – it should be dark, quiet, comfortable, and cool

- Sleep on a comfortable mattress and pillow
- Develop a relaxing routine before bedtime – ideas include bathing, music, and reading
- Do not have pets in your bedroom
- Reserve your bedroom for sleeping only- keep cell phones, computers, televisions, and video games out of your bedroom

Some of these sleep hygiene recommendations are backed by a large body of scientific literature. In particular, sleep duration and consistency have received significant research attention as they have proven to affect child health outcomes, including obesity (Jansen et al., 2018). Sleep timing and variability have received increasing research interest; sleep variability refers to the consistency of going to bed at the same time and waking at the same time. Sleep variability may affect daytime sleepiness, mental health and academic achievement in children (Fuligni et al., 2018; Matos et al., 2016). Therefore, maintaining consistency in sleeping patterns has positive effects on child sleep outcomes.

Sleep hygiene also refers to creating an optimal environment for sleep and includes the physical environment of the home and bedroom (Jan et al., 2008). Bedrooms that are dark, quiet, comfortable, and cool have been found to affect the sleep/wake cycle in children (Galland & Mitchell, 2010). As well, different types of lighting affect child sleep – red light may be more conducive to child sleep, whereas blue light causes interruptions in circadian rhythm (Wei et al., 2019). Cooler room temperatures are recommended, as warmer rooms can disturb child sleep (Richdale & Schreck, 2019). There is growing

concern over the effect of noise on sleep (Aasvang, 2018). Indeed, noise affects slow wave sleep and is likely to cause disruptions in the sleep cycles of children (Smith et al., 2017). In addition, artificial lighting disrupts circadian rhythms and suppresses melatonin levels, affecting metabolism, immune function, and endocrine balances (Navara & Nelson, 2007). Other factors that might affect child sleep includes noise inside the house, snoring, room temperature, and light (Bagley et al., 2015). Therefore, the physical environment is also important in improving child sleep.

Recent research has shifted to investigate the repercussions of increasing availability of technology in the home and screen time use in children (Leatherdale & Ahmed, 2011; Polos et al., 2015). The negative effect of electronics on sleep behaviour is multifaceted. For example, using electronics affects sleep as it requires engagement and blocks the act of falling asleep, while the blue spectrum light that is emitted from electronics causes hormonal suppression (Lee et al., 2018; Mazzer et al., 2018). Altogether, these mechanisms jointly affect child sleep, and the use of a media device in the bedroom has been associated with inadequate sleep quantity, poor sleep quality, and excessive daytime sleepiness in children (Carter et al., 2016). As well, the type of media device may cause changes in heart rate and adrenaline response (i.e. playing video games; violent/horror films on television) and is linked to psychological sleep latency (Lemola et al., 2015). Overall, as per the sleep hygiene recommendations above, it is generally recommended to avoid use of electronics in the bedroom. However, numerous barriers exist that prevent children and youth from removing electronics entirely from their sleeping environment, such as social pressures (e.g. feeling the need to text friends), boredom, and sibling technology use (Quante et al., 2019). In response, there is emerging

body of research that aims to reduce blue light exposure from electronics through screen filters (Mortazavi et al., 2018) or tinted lens/eye glasses (Carlson, 2019; Shechter et al., 2018) to less invasively promote healthy sleep in children.

Emerging research has asked children what parenting practices they feel would best promote their sleep. A study conducted by Eck et al. (2020) in the US States of Florida, New Jersey, and West Virginia, explored child perceptions of parenting practices that would best promote their sleep. Children discussed that they wanted parents to facilitate an environment where they felt comfortable and safe, and to help them restructure their environment to remove distractions and technology. Children also discussed that it would be useful to them if parents planned ahead, scheduled, and managed their time so they would not go to bed late. Lastly, students asked that parents provide them with reminders of why sleep was important to them, and take advantage of opportunities to educate them on the importance of sleep. These findings are important to explore child understandings of how parents can facilitate, or act as a barrier, to sleep behaviour in the home. As there are limited studies that highlight children's voice, there is a gap in the literature to develop an informed perspective of how children perceive parenting practices that best help them sleep.

The above mentioned sleep recommendations for pediatric populations are meant to improve children's sleep hygiene in order to improve children's sleep. Thus, parents who promote sleep hygiene practices in the home may improve their children's sleep. Although these practices are ideal, barriers exist that prevent these practices from occurring. Additional research is required that assess both child and parent perspectives of sleep practices in the home to establish why some sleep hygiene may be performed

while others are not. As well, it is important to address current research gaps that exist in understanding parent's knowledge and attitudes towards sleep hygiene practices in the home. In sum, although general sleep hygiene recommendations can be made, additional research needs to understand how sleep hygiene is implemented within the home.

2.2.1.3 Family customs and parenting practices

Parental values around sleep and parenting practices are shaped by the sociocultural context in which a family is situated, and there is increasing recognition that parenting practices are largely influenced by cultural norms and family customs around sleep that exist within the home (Acosta et al., 2020; Mindell et al., 2015). Co-sleeping and bedtime rituals are often carried out differently across cultures as families have diverse opinions on their effect on children's sleep (El-Sheikh & Kelly, 2017). Current Canadian guidelines state that infants should sleep on their back, in a crib, cradle, or bassinet that is located within their parent's room (Joint Statement on Safe Sleep: Preventing Sudden Infant Deaths in Canada, n.d). However, evidence regarding practices such as co-sleeping (allowing children to sleep in the parent's bed or bedroom) is conflicting, citing both health benefits of bed sharing arrangements in infants (increased breastfeeding and lowered infant stress) and suggesting concerns for infant health and safety (Mileva-Seitz et al., 2017; Waynforth, 2020). Given the controversy that exists over co-sleeping practices, it is understandable that families choose to enforce different practices. As well, structured bedtime rituals generally appear more often in Westernized societies such as Canada and America in comparison to, some European countries such as Italy, Spain, Greece (Jenni & O'Connor, 2005). However, increases in ethnic and cultural heterogeneity within societies make it difficult to make overarching assumptions (Jenni

& O'Connor, 2005). Overall, parental involvement is essential in establishing healthy sleep practices in the home, and cultural norms and family customs highly influence parent sleep practices.

2.2.2 Household SES and the neighbourhood environment

The neighbourhood environment has received research attention in recent years due to the potential impact on child sleep. The effects of the neighbourhood environment on child sleep are often indirect and not fully understood, and have only recently been explored in adults (Billings et al., 2020). As there is less evidence in children, this section will explore the general effects of socioeconomic status (SES) and the built environment within child, adolescent, and adult populations. This section will highlight the importance of utilizing interventions that target child sleep within the home and neighbourhood environments.

2.2.2.1 Household SES and sleep outcomes

SES has been demonstrated to have implications for child sleep – notably, studies have determined that children from homes with lower income have higher levels of reported sleep/wake problems (El-Sheikh et al., 2013). Although SES has various definitions and is often measured differently across studies, SES generally refers to family income, parent education, and occupational status, and has implications for child health and wellbeing (Poulain et al., 2020). Children from lower SES households (lower family income and parent education) may experience delayed bedtimes, increased variability in sleep onset, and decreased total sleep duration (Mezick et al., 2008). Moreover, children from lower SES households may experience poor relationships with

their teachers and lower academic achievement than their higher SES counterparts (Olsen, 2018). As a result, children from lower SES are more susceptible to sleep problems and may experience lifelong disadvantages as a result.

Studies that analyze socio-economic disadvantage often consider the intersections between SES and race/ethnicity, as minority groups are more likely to experience decreased SES (Cheon et al., 2019; Lozoff et al., 1996). Children who are racially and ethnically diverse who live in socioeconomic disadvantage are at higher risk for sleep deficiency (El-Sheikh et al., 2013). For example, in Latinx youth residing in low-income households, participants reported sleep disruptions relating to temperature, outside noise, and snoring family members; these disruptions were then associated with insomnia, and daytime sleepiness (Rubens et al., 2020). Home disruptions within low-income households may be a result of household crowding as well as room and bed-sharing practices (Chambers et al., 2016). One study found that individual's perception of their housing and neighbourhood condition (e.g. broken windows) was associated with shorter sleep duration and reduced sleep efficiency (Troxel et al., 2020). As well, perceptions of violence within a neighbourhood also affect sleep. For example, In African American adolescents in America, both males and females reported having disruptions in sleep that were associated with witnessing violence in their community (Kliewer et al., 2019). Children residing in low-income households may experience sleep deficiencies as a result of late bedtimes and variability in bedtime structure and routine, and lack of parental awareness about sleep hygiene practices (Ordway et al., 2020). In addition, anxiety and mental health concerns are highly linked to sleep, and those living in socio-economic disadvantage may be more prone to anxiety and pre-sleep worries which further

compounds the effect of SES on sleep (Bagley et al., 2015; Rubens et al., 2020).

Although anxiety is likely caused by a variety of factors, one study found that safety concerns may affect child sleep (Chambers et al., 2016). Interestingly, child coping has been put forth as a potential protective factor against reduced sleep associated with economic adversity (El-Sheikh et al., 2014). This suggests that the role of the family environment may mediate the potentially harmful effects of the neighbourhood environment on child sleep. In sum, it is essential to consider the context of the home and neighborhood when formulating sleep hygiene recommendations.

2.2.2.2 The built environment

Neighbourhoods that are more urbanized tend to be high in population density and commercial land use, and are thought to have an impact on child sleep. For example, infants living in urban communities are more prone to sleep problems, while school-aged children living in high-density urban neighbourhoods are more likely to have symptoms of sleep-disordered breathing, night wakings, bedtime resistance, and daytime sleepiness (Bottino et al., 2012; Daniel et al., 2010). As well, urban neighbourhoods that are high in commercial land use may have increased noise disturbance due to increased traffic (King et al., 2012). These noise disturbances have been found to be associated with varying degrees of sleep disruption in school-aged children (Chum et al., 2015; Skrzypek et al., 2017). While it is clear that urban neighbourhoods are associated with detriments to child sleep health, the exact mechanisms by which they affect child sleep is somewhat unclear and often indirect.

Some neighbourhoods may exert detrimental effects on sleep through decreases in available neighbourhood green space (e.g. parks, forests, walking trails, community

gardens, lakes & ponds) and increases in commercial land use (Billings et al., 2020). There is mounting evidence to support the effect of green space on adult sleep, however, there is a lack of evidence for child populations. Although, it could be assumed that both children and adults are affected by green space in similar ways. In adults, it was found that those living with more green space in their neighbourhood (such as tree canopy, open grass) had better sleep in comparison to adults living with less green space (Astell-Burt, 2020). A systematic review concluded that green space exposure was associated with improved sleep quality and quantity (based on supporting evidence from eleven out of thirteen studies reviewed), and suggested that outdoor activities and gardening could improve sleep (Shin et al., 2020). As well, green space reductions may lead to increases in traffic-related air pollution and are thought to affect sleep and mortality rates in adults (Finkelstein et al., 2004). Increases in green space in neighbourhood may have indirect effects on sleep by improving physical activity, as there is a known link between physical activity and sleep (Chennaoui et al., 2015). An increase in green space may improve neighbourhood walkability and active transportation, thus, increasing physical activity levels and sleep quality (Wolch et al., 2014). However, parental concerns over child physical safety and negative interpersonal interactions within play areas may act as a barrier to accessing such areas (Gerlach et al., 2019). Overall, living in urban neighbourhoods with reduced green space may negatively affect sleep.

2.2.3 The school environment

2.2.3.1 School policy and academic commitments

The school environment has both direct and indirect effects on student sleep.

A growing body of evidence supports the extension of school start times to address child and adolescent sleep behaviour, and in turn, improving academic performance through improvements in daytime sleepiness and mood (Boergers et al., 2014). For example, delayed high school start times were associated with longer sleep duration, and improved graduation, alertness, and attendance rates in children and adolescents (Bowers & Moyer, 2017; McKeever & Clark, 2017). Although a large body of evidence suggests that extending school start times accommodates adolescent sleep/wake cycles during puberty (Mazzilli Louzada & Isabel Ribeiro Pereira, 2019) there is evidence that changes in sleep/wake times are evident in children as early as 9-11 years old. One study found that fourth and fifth graders tended to wake up 30-40 minutes earlier than children in previous grades, which resulted in less sleep duration for fourth and fifth graders (Appleman et al., 2015). Students tend to have later bedtimes and sleep onset as they age due to alterations in circadian rhythm, however, wake times may become earlier as grade levels increase (Clara & Allen Gomes, 2020). Thus, children who attend school at the same time, or wake up earlier as they age, are chronically losing sleep due to earlier school start times. Earlier school start times have also been associated with a range of behavioural problems for elementary-aged students such as harassment, in-school removals, suspensions, and expulsions in the United States (Keller et al., 2017). Importantly, students who are less alert in the morning may suffer consequences at school; students who have circadian preference toward morning wakefulness were found to perform better in school than children who are evening oriented (Scherrer et al., 2016). However, a recent systematic review conducted by Marx et al., (2020) identified limitations in supporting later school start times due to the lack of high-quality evidence. Likewise, it is recommended by

Storey et al. (2020) that additional research should assess the impact of delayed school start times on a broad range of health behaviours (e.g. eating habits, physical activity, and sedentary behaviour). Thus, it is possible that flexible/extended school start times may improve student's health and academic outcomes, however, it is inconclusive as to the effects of such policy changes on student health behaviours and academic outcomes.

Academic commitments also have direct effects on student sleep. A sizable amount of evidence to support the effect of homework on student sleep is based within China. This is perhaps due to the expected time commitment of academic-related work and pressure in comparison to western countries, and has been associated with health related consequences such as obesity (Ren et al., 2017). Various other studies exist within Chinese school-aged children. One study found that media use and homework shortened sleep duration (Zhang et al., 2010), while another study found that children with more homework tended to go to bed later, and as a result slept less (Li et al., 2014; Sun et al., 2014). In American adolescents, students who studied rather than slept had trouble learning concepts in class the following day (Gillen-O'Neel et al., 2013). American adolescents have been shown to get less sleep on school nights due to school and school-related commitments when compared to Australian adolescents (Short et al., 2013). Overall, there is an established link between academic and school-related commitments in children, however, little evidence exists to support this link in the Canadian population. Therefore, it is reasonable that homework workload and stress may affect child sleep and health outcomes, however the specific link remains to be investigated in Canadian children.

2.2.3.2 Social relationships within the school

The school environment may have indirect effects on child stress, and therefore affect sleep. The effects of mental health on sleep has been well-established in children, as shorter sleep duration in children is associated with a higher frequency of common mental disorders such as anxiety and depression (Agathão et al., 2020; Chorney et al., 2008; Geijlswijk et al., 2011). Children are likely to experience anxiety around test-taking (McDonald, 2001), and negative peer relationships such as bullying (Chou et al., 2020; Fekkes et al., 2006). A study based in Southeast Asia found that bully victimization and loneliness were positively associated with sleep loss over feeling anxious and worried among adolescents (Wang et al., 2020). Importantly, a prospective cohort study found that children aged 9-11 who were victims of bullying were more likely to develop psychosomatic symptoms, including changes to sleep, than children who were not victims of bullies (Fekkes et al., 2006; Sansone & Sansone, 2008). Overall, anxiety in school and peer relationships in school may affect child sleep. In addition to relationships with peers, teachers may also affect student sleep outcomes. Limited literature exists on the impact of teacher-child relationships and sleep; however, it is established that teacher-child relationships are important to foster student health and academic outcomes (Storey et al., 2016; Sulz et al., 2016; Tilga et al., 2020). For example, it was demonstrated that students who believe their teachers care and have an adult confidant within the school had less academic anxiety, and physical problems (Conner et al., 2014). Thus, additional research is required to explore the direct effect of teachers on student sleep. In sum, social relationships within the school may cause anxiety in children, subsequently causing sleep loss.

2.3 School-based Health Promotion Interventions

Student health directly impacts academic performance, thus, it is intuitive that schools are ideal intervention sites to promote health and education outcomes simultaneously (Bedard et al., 2019; Faught et al., 2017; Stormark et al., 2019). It has been demonstrated that healthy students have improved learning outcomes and that better-educated individuals are healthier (Faught et al., 2017; Sosso et al., 2019). This is a mutually beneficial relationship to schools as students perform better when they are healthier, and provides rationale for the promotion of both health and academic outcomes in schools. In school-aged children, breakfast consumption has been found to have positive implications for academic performance and cognitive functioning (Burrows, 2017a; Lundqvist et al., 2019), while physical activity and mental health are thought to also affect school performance (Gall et al., 2018; Gonzalez-Sicillia et al., 2019). Moreover, children's sleep is linked to school performance; children who sleep well tend to be more successful in school in comparison to children with poor sleep (Reale, et al., 2014; Stormark et al., 2019). Research based in Nova Scotia, Canada found that meeting sleep, dietary, and physical activity recommendations was strongly associated with academic performance in students aged 10-11 years old (Faught et al., 2017). Child health and academic performance are undoubtedly linked.

As such, school-based interventions are an economically viable strategy to promote a wide range of health outcomes, and have been found to address childhood obesity (Dabravolskaj et al., 2020; Dolati et al., 2019; Ekwaru et al., 2020). School-based interventions have historically targeted child healthy eating, and physical activity behaviours as primary intervention strategy (Robinson et al., 2018). Within Canada,

health and educational authorities have recently recognized the need to address student health holistically as many health behaviours are interrelated (Carson et al., 2016; Dumuid et al., 2017). Contemporary school-based health promotion mandates aim to promote various health behaviours as a strategy to address student overall quality of life, psychological, social, and emotional well-being in children (Chan et al., 2019). Moreover, child sleep health has been identified as a public health concern that has complex interactions with student's eating behaviours, physical activity, and mental health (Córdova et al., 2018; Goldstone et al., 2019; Heyman, 2019). Thus, there is a need to identify an intervention strategy that can effectively address a wide range of student health outcomes within schools, including child sleep. CSH is an “internationally recognized framework for supporting improvements in students’ educational outcomes while addressing school health in a planned, integrated, and holistic way” (“Comprehensive School Health Framework”, n.d). CSH aims to bridge student health and educational outcomes in order to make students more successful (Fung et al., 2012) and is predicated on a wealth of literature that suggests that student’s academic achievement is linked to mental, physical, and emotional wellbeing (Gase et al., 2017; Trudeau & Shephard, 2008). CSH will be discussed in more detail below and introduced as a viable strategy to address child sleep outcomes.

2.3.1 Comprehensive school health to address child sleep

Schools that take a CSH approach are ideal locations to improve child health outcomes, including sleep, both directly and indirectly. There are four components of CSH: (1) social and physical environments, (2) teaching and learning, (3) policy, and (4) partnerships and services (“Comprehensive School Health Framework”, n.d). Each of

these components can directly affect child sleep. As well, there is evidence to suggest that the social environment of the school may indirectly affect child sleep if children experience anxiety within school (Donoghue et al., 2018), while partnerships and services may provide additional support to children and families. Importantly, school policy has direct links with child sleep health, as there is strong evidence to suggest that school start times affect child sleep (Bowers & Moyer, 2017). Overall, the school itself is an environment that has both direct and indirect effects on student sleep and can provide a settings-based approach to improve child sleep by addressing the components of CSH.

Perhaps what is most relevant to school-based sleep promotion is the use of the CSH framework to build relationships between the school, home, and community environments to facilitate student health behaviours. Establishing home-school communication is essential in supporting child sleep, as both settings affect child sleep outcomes. As CSH targets the home, it is thought that taking a CSH approach for school-based sleep promotion would address parent knowledge of sleep and improve child sleep outcomes. Promising results have been found for sleep promotion initiatives that target parents to support child sleep (Gruber et al., 2016; Hargadon & Downes, 2019).

However, it has been historically difficult to engage parents and previous research has shown that students are instrumental in reaching the parent community (Storey et al., 2016), and can be mechanisms of change within the home (McKernan et al., 2019).

However, the mechanisms by which students initiate sleep changes in the home have yet to be explored. Overall, The CSH approach is ideal for promoting sleep in children and parents, and is a viable avenue to address child sleep health. Sleep promotion initiatives that focus on child, family, and community education have had success within Canada

(Gruber et al., 2016). Therefore, it is reasonable to assume that interventions grounded in the CSH framework may have success in Canadian children. CSH interventions that promote child sleep may improve both health and academic performance. Indeed, schools that take a CSH approach are ideal locations for interventions targeting child sleep.

2.3.2 School-based sleep promotion interventions

Schools are critical learning settings and are settings in which children can learn to adopt a healthy lifestyle. As well, sleep promotion initiatives can support teachers as sleep is generally integrated into curricular learning outcomes across Canada. However, there is an overall lack of research in this area, especially for elementary-aged children (Gruber, 2017). Of those studies examining school-based sleep promotion, most have examined the adolescent population, in which improvements in adolescent sleep health were shown (Moseley & Gradisar, 2009) (Cassoff et al., 2013). These initiatives typically focused on education and learning within the classroom, and typically used modules, interactive activities, and homework assignments (Araujo, & Azevedo, 2007; Cassoff et al., 2013; Gruber, 2017). A review by Gruber (2017) found that there are only 15 published papers evaluating sleep health promotion programs in a range of elementary-aged to high school aged children residing in various countries. In one of these studies from South Australia (where children were around the age of 12), children were given an intervention consisting of four classroom lessons, an assigned group project on sleep, but found no impact on sleep knowledge or hygiene, and any sleep behavioural changes that were made were not sustained at follow-up (Rigney et al., 2015). Therefore, school-based

sleep promotion interventions typically do not include the wider influences of the home and community environments when attempting to improve child sleep.

One exception is a study in Canada which focused on school-aged children and took a community-based participatory research approach (Gruber et al., 2016). This sleep education program had modules that addressed children, family, community, school staff, and decision makers and had positive results. Those that received the program extended their sleep duration by 18.2 min per night, with improvements in both sleep efficiency and latency. The modules targeted different members of the community – sleep knowledge and education for students, family and community involvement for parents, sleep promotion for staff, and sleep friendly school environment for school principals (address school’s policies, curricula, workload, and activity schedules). This evidence suggests that targeting family, school, and community members can improve the effectiveness of school-based sleep promotion interventions.

2.3.3 Combined impact of health promoting behaviours

School-based sleep promotion interventions that target student health holistically may lead to improvements in sleep overall. Indeed, schools that endorse healthy eating and active living (HEAL) behaviours may improve the likelihood that children sleep better through the promotion of additional health behaviours such as healthy eating and physical activity (Kredlow et al., 2015; Peuhkuri et al., 2012). Specifically, children who engage in HEAL behaviours may have improved sleep (Tremblay et al., 2016). Physical activity and sleep have a reciprocal relationship; daily physical activity is associated with improvement of some sleep variables, whereas children who sleep well tend to be more active (Ávila-García et al., 2020; Stone et al., 2013). Another study found that a high

proportion of intense activity during the day was associated with sleep interruptions, however Ekstedt, et al. (2013) proposed that this may be due to measurement differences as children who are more active during the day may move more during the night. These findings are contested as some studies indicated there were no significant associations between physical activity and sleep in school-aged children (Vincent et al., 2017). While there are mixed results on the exact mechanism by which PA effects sleep, it is generally accepted that children who are active throughout the day sleep better than children who are less active.

Sleep behaviour and obesity are strongly linked in children partially due to complex interactions with eating behaviours (Chaput et al., 2011; Morrissey et al., 2020; Sekine et al., 2002; Thivel et al., 2015). The relationship between sleep deprivation and nutrition impacts energy balance, satiation, increased food intake, meal consumption frequency, and poor diet quality (Chaput, 2016; Fisher et al., 2014). Although a strong body of evidence links sleep patterns to eating behaviour in children, the specific relationships between sleep duration, bedtime, and wake-up time on caloric intake and eating habits are still disputed (Thivel et al., 2015). Shortened sleep duration in children may result in alterations in food consumption as sleep deficiency interferes with the production of appetite-regulating hormones and adipokines (Lin et al., 2020). Thivel et al. (2015) found that children who both consumed breakfast every day and ate fewer snacks on weekdays had early bedtimes when compared to children who did not consume breakfast. Another study found that variations in bedtime and wake-up times are independently associated with poorer diet quality in children, regardless of sleep duration, physical activity levels, and child sociodemographic characteristics (Golley et al., 2013). Sleep variability is

novel and represents differences in bedtimes, wake-up times, and sleep duration, and may be more related to energy intake and nutritional consumption than sleep duration alone in adolescents (He et al., 2015). Establishing healthy sleep behaviours in youth is vital in preventing numerous health-related outcomes, and schools that implement a range of programs that target physical activity and healthy eating are well-suited to address student sleep behaviours.

2.3.4 Students as change agents

More recently, children have been conceptualized as “change agents” and are thought to play an active role in promoting healthy lifestyles in their families through encouragement of physical activity and healthy eating (Gadhoke et al., 2015; Gunawardena et al., 2016). However, there is minimal research to determine the role that children play in shaping family sleep behaviours, warranting further investigation. It is promising that school-based sleep promotion interventions are being evaluated in children and adolescents (Cassoff et al., 2013; Gruber, 2017). However, it is unclear of the specific role that children play in driving improvements in sleep behaviour in the home. The following section will review the effect of school-based health promotion interventions on the home environment, and explore current understanding of the mechanisms which underlie student translations of health information from the school to the home.

Schools are ideal venues for children to learn health information and subsequently drive changes in the home environment. In fact, a significant body of literature focuses on the effect of school-based health interventions on family health (Bresee et al., 2016;

Burrows, 2017b; Gadhoke et al., 2015; Gunawardena et al., 2016). Indeed, schools that promote health have found evidence for improvements in a wide range of student health behaviours (Dabravolskaj et al., 2020). An increasing body of literature has found that students that share health information with their families result in improvements in family fruit and vegetable consumption (Davis et al., 2002) and physical activity (Simovska & Carlsson, 2012). Moreover, it is promising that adolescent sleep health has been included in recent reviews of school-based health promotion interventions (Champion et al., 2017). However, due to the paucity of evidence of school-based sleep promotion interventions in children and adolescents (Gruber, 2017), it is difficult to know if school-aged children are change agents and foster healthy sleep behaviours in the home.

Understanding the mechanisms by which children choose to drive healthy behavioural changes in their home is complex. Although research exists that indicates that children act as change agents in the home (Gunawardena et al., 2016), it is unknown the reasons why children choose to share information with their family members. Bresee et al. (2016) proposed antecedents to Zambian children sharing information with their family about hand-washing practices: children (1) wanted their family to learn about health, (2) wanted to see improvements in health behaviours in the home, and (3) believe that their family will trust and be receptive to the information they share. As well, emerging research has shown that schools which foster leadership and decisional ownership in students may underlie a student's ability to drive changes in the home (McKernan et al., 2019). Additional research points to the importance of providing a clear framework that enables students to actualize and act on their ideas, which fosters feelings of “ownership, efficacy, and achievement in working with real-life problems”

(Simovska & Carlsson 2012). Overall, the specific mechanisms by which students translate sleep promotion from school to the home environment has yet to be investigated.

2.3.5 APPLE Schools

APPLE Schools is an evidence-based, innovative, and globally recognized health promotion intervention that exists in 74 elementary school communities in Alberta, Northwest Territories, Manitoba, and British Columbia and impacts the lives of 20,000 Canadian students annually (“About APPLE Schools”, n.d). APPLE Schools takes a CSH approach to create, support, and sustain healthy school communities, and aims to shift school culture to embrace health (Storey et al., 2016). APPLE Schools aims to improve student health by making health a core focus within the school’s teaching and learning strategies, while simultaneously addressing each school’s physical and social environments. Overall, interventions are inclusive and adaptable to meet unique school needs and to encourage engagement from all members of the school community. Based on school preferences, APPLE Schools may provide teachers with health resources such as lesson plans, planning tools, handouts, teacher guides, and educational kits. As well, parent participation is facilitated and encouraged as parents are included in activities within the school, and receive newsletters and/or interactive activities to complete with their children at home (Resources Overview, n.d). APPLE Schools also modifies the physical and social environment to promote health; for example, healthy food options for lunch and vending machines, fitness-related activities, and activities that engage the wider school community to engage and promote healthy school culture. As a result of the

APPLE Schools intervention, student healthy eating and physical activity behaviours have demonstrated improvements (Fung et al., 2012). Furthermore, these improvements are viewed as a cost-effective strategy to reduce the health burden within Canada (Ekwaru et al., 2020). APPLE Schools includes sleep promotion within their mandate, and has implemented sleep promotion campaigns such as ‘Be A Sleep Star’ and ‘Sweat, Step, Sleep, Sit’ and ‘Don’t Be The Walking Dead’ since 2012. However, to the researcher’s best knowledge, no studies have evaluated the impact of sleep promotion at school on sleep behaviours in the home environment. Therefore, there is a clear need to explore the role of the school and home in shaping student sleep behaviours.

2.4 Summary Statement

This literature review demonstrated that school-aged children (ages 5-12) within Canada require sleep for health, educational outcomes, and overall success (Michaud & Chaput, 2016). Alarming, it was found that 30% of Canadian children are not meeting national recommendations and recent reports indicated a decline in sleep duration over the last two years (ParticipACTION, 2020). A significant amount of evidence suggests that child sleep is shaped through a variety of influences embedded within the context of the home, neighbourhood, and school environments. Thus, it was determined that interventions which collectively target various home-school influences may effectively improve child sleep, and CSH was proposed as an effective strategy to address child sleep, health, and academic outcomes. In response to this literature review, this research aims to fill that gap and will: (1) examine children’s perceptions of their own sleep behaviour and determine if and how they translate sleep behaviour changes home; and (2)

explore parent's perspectives on sleep behaviours and how parenting practices facilitate and support, or act as a barrier, to their children's healthy sleep behaviours. The findings from this research will integrate relevant literature in order to provide research, policy, and practice recommendations for school-based sleep promotion interventions that aim to improve the sleep behaviours of school-aged children.

CHAPTER 3: USE OF STUDENT-CENTRED PHOTOVOICE TO EXPLORE THE TRANSLATION OF SLEEP PROMOTION AT SCHOOL TO SLEEP BEHAVIOUR AT HOME

3.1 Introduction

Sleep is required for healthy growth and development in children (Carson et al., 2017; Gilad & Shapiro, 2020; Saunders et al., 2016); however, approximately 30% of Canadian school-aged children are not getting adequate sleep and may suffer adverse physical and psychosocial health outcomes as a result (ParticipACTION, 2020). Indeed, inadequate sleep in children has been associated with childhood obesity, insulin resistance, and hypertension (Hanlon et al., 2019; Sparano et al., 2019). It has also been associated with daytime sleepiness, hyperactivity, impulsivity, memory, and attention issues (Alfano et al., 2020; Palmer et al., 2019). Furthermore, children with poor sleep may suffer additional health consequences stemming from decreases in physical activity and unhealthy eating behaviours (Chaput, 2016; Fisher et al., 2014; Stone et al., 2013). These physical and psychosocial outcomes are detrimental to children's educational outcomes (Blunden, 2012; Faught et al., 2017) and quality of life (Magee et al., 2017). Clearly, children's sleep is a public health issue that requires intervention to prevent adverse health and academic outcomes.

School-based health promotion interventions that are grounded within the comprehensive school health (CSH) approach are an increasingly favourable option to address child health and academic outcomes (Fung et al., 2012; Langford et al., 2014). Currently, sleep education is integrated within province-wide curricular learning

objectives, and alignment between the health and education sectors provides novel strategies to meet these objectives. In Canada, the Pan-Canadian Joint Consortium for School Health (JCSH) was founded in 2005 to foster collaboration between health and education sectors and guides the implementation of CSH across Canada (“What We Do”, n.d). Home-school collaboration is at the core of the CSH framework (“The 4 Components of Comprehensive School Health”, n.d) as partnerships between the home and school are effective in addressing student health and academic outcomes (Epstein, 2018; Patrikakou, 2016). Students have previously been identified as the bridge that links the school and home environments and may assist with home-school communication by initiating health behaviour changes in the home (McKernan et al., 2019). Surprisingly, there is minimal research on the effectiveness of school-based sleep promotion interventions that target school-aged children’s sleep (Blunden et al., 2011), with even less framed within the CSH approach. As well, current evidence from school-based sleep promotion interventions demonstrate little behavioural change in children and adolescents, which warrants the need for more effective interventions (Cassoff et al., 2013; Gruber, 2017). As initiatives which aim to support students in addition to family and school staff have been shown to improve child sleep (Gruber et al., 2016), school-based sleep promotion interventions grounded in the CSH approach may be effective in promoting healthy sleep habits in the home. Thus, additional research is required to understand how interventions guided by CSH affect child sleep behaviours. The CSH approach appears to be a viable option to address inadequate sleep in children within the context of the home and school environments. The purpose of this research was to

examine children's perceptions of their own sleep behaviour and determine if and how they translate school-based sleep promotion home.

3.2 Methods

3.2.1 Setting: APPLE Schools

APPLE Schools is a school-focused health promotion initiative that exists in 74 elementary school communities in Alberta, Northwest Territories, Manitoba, and British Columbia ("About APPLE Schools, n.d) and impacts the lives of 20,000 Canadian students annually. As an evidence-based, innovative, and globally recognized health promotion intervention, APPLE Schools takes a CSH approach to create, support, and sustain healthy school communities (Storey et al., 2016). By taking a whole school approach, APPLE Schools impacts the health of families, students, and school community members by fostering supportive relationships between student, parent, school staff, and community partners. APPLE Schools provides teachers with health resources such as lesson plans, planning tools, handouts, teacher guides, educational kits, and encourages interactive activities to engage the whole school ("About APPLE Schools", n.d.). As well, parents receive newsletters, informational handouts, and/or interactive activities to complete with their children at home, such as home challenges ("Resources overview", n.d.). APPLE encourages all members of the school community to promote healthy school culture through "visual displays, positive interactions, and healthy messages being championed by all staff" ("Welcome to our APPLE School Community", n.d.). Students are encouraged to engage in non-conventional activities that encourage healthy school culture, such as hopping down the halls and nurturing gardens within the school to harvest and eat (APPLE Annual Report, 2019). These activities are

tailored to the unique needs of each APPLE School and serve to enhance healthy school culture among students, parents, school staff, and community partners. As well, APPLE Schools may have a trained School Health Facilitator (SHF) that works with students, parents, school staff, and community members to promote healthy living through the development of an individualized school action plan (“About APPLE Schools”, n.d).

APPLE Schools has proven effective in improving child physical activity and healthy eating practices (Fung et al., 2012). In addition, APPLE Schools has included sleep promotion within their mandate through sleep promotion campaigns such as ‘Be A Sleep Star’, ‘Sweat, Step, Sleep, Sit’, and “Don’t Be the Walking Dead” since 2012. These campaigns include teaching lesson plans, daily announcements, bulletin boards, and a parent newsletter. As well, home challenges aim to support families in prioritizing sleep and includes sleep tracking, minimizing screen time, and tracking dreams in a dream journal to highlight how sleep can be fun. Tips for parents are provided to support parents in carrying out these activities are available on the APPLE Schools website. Overall, APPLE Schools incorporates sleep promotion in a variety of ways in both the school and home. Therefore, APPLE Schools is an ideal location for this research as it is an effective health promotion strategy which includes sleep promotion in its implementation strategy.

3.2.2 Researcher positionality and theoretical perspective

This study was coordinated by a master’s student (School of Public Health) who has experience in qualitative methods and completed the project with the support and guidance of an experienced qualitative researcher (school of public health) with input from committee members with relevant expertise and knowledge fitting the research

scope (1 professor in the department of occupational therapy, 1 professor in the department of secondary education). The student has direct experience interviewing participants individually and conducting focus groups in multiple research studies, and has experience in study guided by the community-based participatory research (CBPR) approach which utilized photovoice as a data generating strategy. After completing an undergraduate degree in Kinesiology, the student had specialized as an exercise physiologist and gained experience implementing a range of behavioural change strategies at the individual/interpersonal levels.

This study was guided by qualitative inquiry and explored student's understandings of sleep behaviour. Qualitative inquiry is driven by naturalistic, interpretive, and inductive strategies (Mayan, 2009). A research paradigm is defined as a "set of interrelated assumptions about the social world which provides a philosophical and conceptual framework for the organized study of that world" (Filstead, 1979, p. 34) and serves to explore "the nature of the world, the individual's place in it, and the range of possible relationships to that world and its parts" (Guba & Lincoln, 2004, p. 21). The researcher employed a constructivist perspective which informed a relativist ontology and subjectivist epistemology. A constructivist perspective asserts the existence of multiple realities and assumes that "truth and reality are inevitably intertwined with social context and meaning" (Allen, 1994, p. 33). In line with a constructivist perspective, a relativist ontology asserts that multiple social realities exist and these constructions are related to specific contexts (Guba & Lincoln, 1994). Guided by a subjectivist epistemology, it was assumed that the researcher and students co-constructed knowledge with one another, thus, in order to assess the researchers contribution to the knowledge creation process, it

was essential that the researcher utilized reflexivity at each stage in the research process (Schwandt, 1994).

3.2.3 Research approach and method

3.2.3.1 Community-based participatory research

This study aligned with tenants of community-based participatory research (CBPR) approach due to the collaborative nature of the project (APPLE Schools) and the combination of a method and data generating strategy that cumulatively serve to highlight the student voice and expertise (Israel et al., 2013; Minkler & Wallerstein, 2011; Satcher, 2005). These relationships allowed the research team to work directly with students to identify the contextual relevance of sleep behaviours and position student's experiences as essential to evoking policy change. The partnership between APPLE Schools and the research team allowed for capacity building within schools and will ensure broad dissemination of results through existing stakeholder relations.

3.2.3.2 Focused ethnography

Focused ethnography was used to guide this research and is a targeted form of ethnography that seeks to understand a specific social or cultural setting (Mayan, 2009). Focused ethnographies are "time-limited exploratory studies within a fairly discrete community organization" (Muecke, 1994, p. 199). Focused ethnography is a method used to understand the "interrelationships between people and their environments in the society in which they live" (Cruz & Higginbottom, 2013). This method is informed by a specific research question and gathers data to inform decision-making practices (Mayan, 2009). Focused ethnography is successfully utilized in various applied health settings

(Wall, 2014) and has utility in school contexts (Oyarzún-Gómez & de la Pava, 2019; McKernan et al., 2019). In this study, focused ethnography was appropriate as the research question was problem-focused and context-specific; student's perspectives of sleep behaviour were explored in an attempt to address sleep health within the context of APPLE Schools. Focused ethnography was used to target a discrete community or organization (APPLE Schools). A single researcher delivered the conceptual orientation to frame the research and included episodic participant observation in contrast to long-term and intensive participant observation described in traditional ethnography. Focused ethnography was in alignment with the identified constructivist perspective as it assumed the existence of multiple realities and that participants held specific knowledge that critically informed the researcher's understanding of the phenomenon (Ponterotto, 2005).

3.2.4 Data generation

3.2.4.1 Photovoice

Photovoice is a data generating strategy that allows participants to convey their knowledge and expertise through visual representation (Wang & Burris, 1997). Participants use cameras to produce images as a means of communicating a specific topic or issue (Wang & Burris, 1997). Photovoice aligns with both CBPR and focused ethnography – taking and sharing of photos promotes a rich understanding of a specific social setting and validates participant expertise, ownership, and decision-making (Israel et al., 2013; Mayan, 2009). Photovoice originates from theoretical frameworks of critical theory, feminist theory, and documentary photography (Sutton-Brown, 2014; Wang & Burris, 1994) and serves to address power imbalances, which are further exacerbated when working with children (Hergenrather et al., 2009). Photovoice was chosen as a data

generation strategy for this research due to its ability to explore health behaviours, its utility in classroom environments (Carnahan, 2006; McKernan et al., 2019; Spencer et al., 2019), and overall success with children and youth (Heidelburger & Smith, 2016; McHugh et al., 2013). Photovoice is a technique that allows for genuine student participation and engagement, allows for communication between the school and home, and addresses multiple learning domains. Thus, it is situated well within classroom contexts (McKernan et al., 2019). Photovoice improves communication between students and researchers, and provides access to the home environment (Wang & Burris, 1997). The photovoice process for this research is described in detail in the ‘Procedures’ section below.

3.2.4.2 Participant observation and field notes

Participant observation is a data generating technique where the researcher actively engages in the research setting by recording daily routines and activities (Schensul et al., 1999). This “process of personally participating in the research setting” (Mayan, 2009, pg. 76) allows the researcher to interact with day-to-day patterns and cultural experiences that may not be available through other data generation means and is a means to understand the phenomenon of interest (Schensul et al., 1999). Participant observation can be used in a variety of settings to gain insight into participant behaviour and is rooted in ethnographic fieldwork (Mayan, 2009, pg. 76). Importantly, it allows the researcher to understand social organization and relational concepts that may not be disclosed in interviews (Schensul et al., 1999). Recorded observations from participant observations are documented as field notes. Field notes are the researcher’s subjective interpretation of their observations, and also include “reflections, feelings, ideas, moments of confusion,

hunches, and interpretations” (Mayan, 2009, pg. 77). Field notes tend to be written up immediately after an observation period and may include information about who is there, what is happening, where it is located, how individuals interact, and why the group operates as it does. These subjective recordings are in alignment with the constructivist perspective (Ponterotto, 2005).

The researcher took detailed notes of the classroom environment and individual interviews, and described the research settings in-depth in a journal. Initial observations of the environment, which included reflections, feelings, hunches, and interpretations were also recorded. After each interview, the researcher debriefed with all members of the research team to discuss overall conceptualizations of each interview. Both the participant observation and field notes were included in the data analysis. As this study was coordinated by the researcher (a master’s student in the School of Public Health) the observations and journaling was completed with the guidance of an experienced qualitative research coordinator (school of public health) with input from the student’s supervisor.

3.2.5 Participant recruitment within APPLE School

To initiate the recruitment process, the researcher consulted with the APPLE Schools management team in the fall of 2018 to identify schools to approach in order to recruit grade 4/5 students. Inclusion criteria for school-level participation included: (1) being an APPLE School that promotes sleep, and (2) inclusion of at least one grade 5 classroom. Collectively, five schools were identified and approached. The APPLE Schools management team connected the researcher with the schools via email, and three

schools subsequently responded and expressed interest. Although each participating school did not have a designated school health facilitator at the time the research took place, each had identified a health champion that provided ongoing health promotion within each school. The interested principals and teachers were provided: (1) a copy of the ethics and school board approval letters, (2) a detailed information letter explaining the stages of the proposed research (Appendix A), and (3) a sample photobook and newsletter from a previous photovoice project (McKernan et al., 2019). Ultimately, one classroom from each of the three schools participated. The researcher then met in-person with teachers to thoroughly explain the project, including timelines and classroom/student participation requirements, and to answer questions. This also provided an opportunity to build relationships with participating schools, teachers, and students, which allowed for openness throughout the research process. It has been suggested that emotional factors are more highly related to the understanding of research participation than age or cognitive development, suggesting that building rapport with students and helping them to feel safe is important when communicating the research process (Dorn et al., 1995).

3.2.5.1 Participants

A total of 45 grade 4/5 students from three APPLE Schools were purposefully sampled. Purposeful sampling is the selection of participants who have specific knowledge or experience that fits the needs of the study (Morse, 1991). Grade 4/5 students were chosen as children ~9-11 have the cognitive ability to explain concepts to the researcher, engage in operational thinking, and provide assent (Burke et al., 2005;

Ondrusek et al., 1998; Weithorn, 1983). The inclusion of both grade 4 and 5 students stemmed from convenience as two of the three classrooms that participated were grade 4/5 split classrooms. Within qualitative research, sample size can vary significantly (Bauer et al., 2019; Pace & Gabel, 2018; Spencer et al., 2019) and is often determined based on saturation. Saturation is conceptualized as a stage of data analysis that occurs “when no new data emerge” and “when the story or theory is complete” (Mayan, 2009, p. 63). Although saturation is a long-standing aspect of data generation within qualitative research, the abstract nature and lack of a clear definition contests its validity as an approach to determine sample size in contemporary qualitative research (Clarke & Braun, 2020). Thus, the researcher attempted to recruit a sample size based on the selected method (focused ethnography) and similar research utilizing photovoice. A sample size of 20-30 is consistent with studies utilizing an ethnographic approach (Mayan, 2009) and photovoice with school-aged children (Genuis, et al., 2015; Heidelberger & Smith, 2016; McKernan et al., 2019). It was anticipated that attrition may occur when working with student populations as students must successfully return consent forms and cameras, take enough photos to accurately represent their experience, agree to participate, be available for an interview, and be comfortable in opening up to the researcher during collect generation. Previous research indicated limitations such as privacy and parental support when utilizing photovoice with school-aged children (McKernan et al., 2019). As such, we recruited additional students to ensure that enough data could be utilized towards creating a rigorous study (Morse, 1991). As the results of this project will inform a larger initiative aiming to improve school-based sleep promotion across Canada, it was

important to recruit enough students to ensure transferability of the study (Krefting, 1991).

Of the 45 students (n=19 male, n=26 female), 10 were from “School A”, 18 were from “School B”, and 17 were from “School C”. The average age of students was 9.75 years (range 9-11 years) and most students (n=27) were in grade 5 (1 grade 5 class, 2 grade 4/5 split classes). 29 students attended their school since Kindergarten, 10 attended for the last 2-3 years, and 6 only attended within the last year. Living arrangements varied and students reported living in a house (n=26), townhouse/condo/duplex (n=15), or apartment (n=4). Out of the 45 students, 29 students had their own room and slept alone, while 16 slept in the same room as siblings (of which 8 slept in the same bed or a bunk bed). Students reported average wake-up times (6:45 am on weekdays, 8:15 am on weekends) and average bedtimes (8:30 pm on weekdays, 9:45 pm on weekends). Bedtimes were enforced by only mom (n=20), only dad (n=5), a combination of mom/dad (n=6), by grandparents or older siblings (n=8), and no enforced bedtime (n=6).

3.2.6 Procedure

Stage 1: Classroom brainstorming & photo-taking

The first stage included an in-class presentation and brainstorming session (Appendix D) for students in each of the participating classrooms. The purpose of this stage was threefold: (1) to introduce the research project, (2) to facilitate student conceptualization of the research topic, and (3) to introduce the research team and develop rapport with students and teachers. Students partook in independent, small and large group work which facilitated conversation and gradually introduced the research

topic. Students were asked to reflect on their experiences with the ‘Be A Sleep Star’ campaign to help students conceptualize their school experiences of sleep promotion and understand the purpose of the research project. All schools had recently implemented the ‘Be A Sleep Star’ campaign that included sleep hygiene lesson plans, school-wide bulletin board postings, and daily informational announcements about sleep. However, in-line with the APPLE Schools intervention strategy, each APPLE School identified unique school needs and had different action plans to broadly promote sleep. Thus, students were also asked more broadly about their school experiences relating to sleep. Through a ‘word web’ activity, students were able to brainstorm experiences and summarize their knowledge. Students were then given a single-use 27-exposure disposable camera and photo-taking instructions with a mission to take pictures of what ‘Be a Sleep Star’ looks like in their home. Students were then taken through a demonstration of how to operate a disposable camera and were advised to avoid taking pictures of people and to stay safe when taking photos. Students were given one week to take photos and return cameras to their teacher. Every student in the classroom received a camera regardless of having returned their consent forms, and was told that they would receive a copy of their photos even if they were unable to participate in the interview. The research team allowed time for questions throughout the session entirety. Importantly, it was emphasized that students have fun and be creative and that there were no right or wrong ideas. Students were reminded that they would be asked to explain the reason why they took their photo.

Stage 2: Individual Interviews

After student cameras were collected and photos were developed, one-on-one semi-structured interviews were conducted with students. While photovoice typically includes focus group discussion to encourage interactions among participants (Wang & Burris, 1997), it was decided that one-on-one interviews were most appropriate. Individual interviews allowed the research team to gain in-depth insight into student photos, and it was felt that children would feel more comfortable expressing potentially private and sensitive information independently. All interviews were scheduled with the assistance of the classroom teacher to ensure convenience. Individual interviews were conducted in a quiet space within the school and included classrooms, free workspaces, and libraries. Interviews were 30-40 minutes in duration and included 1 student and a member of the research team. To ensure rigour and reflexivity, members of the research team recorded their initial thoughts and observations on a separate page of the interview guide, or reviewed these interpretations in person with the researcher after the interview. The structure of the individual interview was as follows: (1) selection, (2) contextualization, and (3) codifying photos. Demographic information was also collected at the beginning of the interview, and additional questions were asked to facilitate discussion. The complete interview guide is found in Appendix E.

(1) Selection: Students were asked to choose 5-6 photos that best represented what ‘Be a Sleep Star’ looked like in their home. However, additional photos were included if the student expressed interest in speaking to their importance. The process of selection is flexible and can utilize differing selection strategies (Castleden & Garvin, 2008; Sutton-Brown, 2014).

(2) *Contextualization*: Students were asked to tell the story behind each of their photos. The contextualization stage of the interview followed an adapted version of the SHOWeD technique established by Wang (2006). Students were asked to identify in their photos what they saw, what was happening in their home, how it affected their life, why they have/do this in their home, and what influenced them to do this. This process allowed students to have meaningful conversations about their photos.

(3) *Codifying*: Students were then asked to separate their photos by developing themes. Examples included ‘being comfortable,’ ‘physical activity,’ and ‘healthy snacks before bed.’ The theming process allowed students to reflect on the contextualization of their photos and categorize based on their experiences (Sutton-Brown, 2014). By identifying themes, students more succinctly described the deep contextual knowledge behind their experiences.

Stage 3: Member-checking

Member-checking is the process of returning back to participants to confirm ideas and perceptions (Charmaz, 2014, pg. 216). By requesting feedback from students, the researcher can validate or disprove the interpretation of the data (Cope, 2014). Although not typically represented in the photovoice process (Wang, 2003), member-checking is often an important component of the qualitative verification processes (Morse et al., 2002). Member-checking for this research involved classroom visits and large group discussions with students. The researcher shared preliminary findings with students using a PowerPoint presentation, and then sought student feedback through facilitated discussions. Discussions allowed students to provide feedback and suggestions regarding

researcher interpretations. Students were thanked for their participation and led to understand that their opinions were important to the research project.

3.2.7 Data Analysis

Each interview was recorded and transcribed verbatim by a professional transcription service. Data were then imported into NVivo12 software and analyzed (Richards, 1999). The researcher recorded initial thoughts and interpretations after each student interview, and recorded how students contextualized and codified their photos. These descriptions served to establish initial codes and categories within the data and were referred to throughout the analysis process (Phillippi & Lauderdale, 2018). Latent content analysis was used to identify meaning units and describe student's understanding of the translation of school learned sleep promotion to the home. Firstly, transcripts were read line by line to identify initial codes (Miles & Huberman, 1994). Secondly, codes were then arranged to fit within categories, and these categories were reorganized and/or dissolved as new relationships emerged from the data (Miles & Huberman, 1994). Lastly, overarching themes were established that provided a rich and descriptive account of student experiences. Concepts within the themes were distinct and did not overlap. As well, field notes were utilized throughout the data analysis process. Records of researcher reflections, feelings, ideas, and interpretations informed data analysis by providing context and allowing the researcher to reflect on their involvement with each participant (Seers, 2012).

3.2.8 Rigour

The researcher was reflective of methodological congruence throughout the research project (Krefting, 1991). Rigour is established using four criteria established by Guba & Lincoln (1982): credibility, transferability, dependability, and confirmability. Credibility ensures results are accurately representative of the data (Mayan, 2009). Credibility was achieved throughout this project as probing was used within interviews to gain depth and questions towards clarity or understanding were addressed during the interview and throughout the member-checking process. As well, member-checking provided clarity to the researcher after a preliminary review of the transcripts was conducted. Throughout the data generation process, the researcher consulted with critical friends to debrief and test emerging hypotheses (Lincoln & Guba, 1986). As well, the findings of this project have enough depth that they can be applied to other contexts and settings (Krefting, 1991) and thus, demonstrate a degree of transferability. The results of this project will inform a larger initiative aiming to improve school-based sleep promotion across Canada, and thus are transferable to other contexts.

3.2.9 Ethics

Ethics approval was granted by the University of Alberta Human Research Ethics Board [Pro00078831]. The Cooperative Activities Program in the Faculty of Education at the University of Alberta facilitated school-board level approval. Written parental consent (Appendix B), and verbal student assent (Appendix C) were required for participation in the research. To foster inclusion, all students were included in the photo-taking activity even if their parents did not provide consent for the research. Therefore, all students were engaged in curricular learning objectives and received printed copies of their photos. To ensure anonymity and privacy, students were advised to avoid taking

photos of people. The research team reviewed all photos and excluded any with people and/or inappropriate content. It was explained to students that they did not have to share their photos with the class if they were uncomfortable doing so. Prior to individual interviews, students were told that they could stop at any point if they were uncomfortable without consequences. Students were also told that they had control over their participation and were allowed to change their mind, and were allowed time to ask questions. The research team had procedures in place if sensitive topics arose and if action was necessary to protect the child.

3.3 Results

Four themes emerged from the data: (1) sleep is “healthy for your body and brain,” (2) sleep habits are rooted in the home environment, (3) school experiences shape positive sleep habits at home, and (4) students translate sleep promotion home if they think it is useful to the family. Students conceptualized that sleep was important to be able to use their brain to think clearly, focus and feel prepared for school, and helped them have a positive mood. Students also recognized that sleep helped their body grow, and helped them avoid illness. Students depicted that their sleep habits were rooted in the home, however, noted that their school experiences shaped their positive sleep habits. Students described that they translated sleep promotion home because they wanted their family to be healthy and felt the need to address their sibling’s sleep habits.

3.3.1 Sleep is “healthy for your body and brain”

Students perceived sleep as important to their health – one student described sleep as “healthy for your body and brain” (P33, School C, Female, Age: 9, Grade: 4). Students

understood that sleep affected their body and brain in different ways. Students recalled that sleep was healthy for their brain because it helped them to think clearly and feel prepared for school. Students also described that sleep helped them to have energy to play with friends and be involved with everyday activities. One student described how sleep affected them in many ways: “If you don’t get enough sleep you’re not going to have enough energy for the next day, and if you don’t have enough sleep you’ll feel like in a grumpy mood. And you might get sick.” (P44, School C, Male, Age: 9, Grade: 4).

Students believed that sleep was healthy for the brain. Students explained that sleep was important for them to think clearly and process information, and was important for memory, focus, and attention. One student indicated that if they did not sleep they would not be able to “think [and their] brain’s not going to be able to process” (P11, School A, Male, Age: 11, Grade: 5). The impact of sleep on memory, focus, and attention was often described as relating to feeling prepared for school. Feeling prepared for school meant that students felt like they could pay attention and have the energy to participate in class. Students recalled that sleeping would help them feel ready for the school day and keep their mind sharp. Students also described that if their brain did not work because they were tired, that they would not feel like doing anything in class, and just wanting to sleep.

Students also described that sleep was healthy for the brain as it helped them feel less tired and moody. If students did not sleep well they described themselves as “cranky, really cranky” (P13, School B, Male, Age: 11, Grade: 5). Students expressed that if they did not sleep well they would be grumpy in the morning and might feel worried throughout the day. Students explained that getting enough sleep was important to have a positive attitude. One student recounted that they go to bed when they are cranky because

sleep helps improve their mood. Students also described that if they did not have enough sleep that they could be rude to others, as one student described the impact of sleep on their mood:

[Student] Yes because my teacher have taught – another student brought up that if we don't get like any sleep at all, we could possibly die or something like that, or it could affect our mood in school. Like we could be grumpy or like during school days. And that would kind of affect the way we act around others. If we don't get enough sleep, we could be grumpy around others and maybe hurt their feelings. And I don't want that to happen. Sleep, like if you sleep – the more you sleep it can heal your bones if they're broken. And it keeps you healthy. And your brain and body to help you keep moving every day. (P51, School C, Female, Age: 10, Grade: 5)

Students described that sleep was healthy for their body. Students expressed that sleep was important for their body to grow and develop; one student described how sleep was important for their brain to get bigger. Students recalled that if you did not sleep then you would not be able to grow. Sleep was seen as important to help the immune system fight viruses and to avoid getting sick. Students also said that their injuries would not be able to heal properly if they did not get enough sleep. Students described the immediate effects of being tired their body – they described feeling sore and having itchy eyes.

3.3.2 Sleep habits are rooted in the home environment

Students described that their sleep habits were rooted in experiences in the home. Students could easily recall their bedtime routine and described that it had always been their routine as they grew up, with small changes made as they aged. When recalling the bedtime routine, students explained that their parents would tell them the plan for the night. Often students stated that the reason why they had a sleep habit was because they just knew, and “that [was] the way it’s always been” (P6, School A, Female, Age: 9, Grade: 4). Sometimes students were not sure where they had learned about a sleep habit, but remembered that they had done it since they were young (e.g., reading before bed, brushing teeth, and having a bedtime snack). Evening routines often included free play time, watching television or playing video games, doing chores or homework before or right after dinner, and preparing lunch for the next day. Unstructured play time was described as meeting up with friends, going outside or to the playground, jumping on the trampoline, and playing with lego and/or dolls. Student’s routines right before bed usually included having a shower or a bath, a bedtime snack, brushing their teeth, and then settling into bed to read, draw, journal, or engage with electronics. One student described their bedtime routine and their mother’s involvement throughout the evening:

Okay so then after dinner my mom says to put on my pajamas and then we go downstairs and we could play on the computer or iPad, or our TV. And then when it’s time to go to bed, my mom will um tell us to go to bed and then I will go to the bathroom, brush my teeth. I will wait for my mom to be done home reading with my sister, and done home reading with my sister; and then my mom will

come in my room and she'll bring my water and my vitamins, and then I will read my book for my home reading. (P34, School C, Male, Age: 9, Grade: 4)

Sleep routines were often established by parents; however, parents were involved in differing ways. Most commonly, students indicated parents guided them through their bedtime routine and helped to make their bedroom feel comfortable and safe. The majority of students indicated their parents set rules for them around bedtime and were involved in their bedtime routine (e.g., reading to them before bed), while others could go to bed whenever they liked and had more independence in determining what to do before bed. Students described that their parents were generally more involved in their routine when they were younger. One student mentioned that they used to read with their parents when they were younger, but now they read on their own while their parents read to their younger sibling. In regards to the physical environment, students recalled that their parents bought them stuffed animals, sleep masks, night lights, fans, or humidifiers to help them feel comfortable and safe. One student described that her parent responded to her feeling afraid when trying to sleep and made her a dreamcatcher to help her feel safe:



Figure 1. “My Dreamcatcher”

Cause I'm Metis so it's a part of my culture. And my mom made it so that – because I have nightmares, and it helps me sleep cause it – cause it's supposed to get rid of the nightmares and bring in dreams. So, I just took a picture cause it's one that my mom made, its memorable. And it's something that helps me sleep again. I know that I'm safe cause when I go to sleep I, I told you I have nightmares...[My mom] knows about the culture, so she just got this kit and she just made the dreamcatcher for us. (P5, School A, Female, Age: 9, Grade: 4)

Students also expressed that their sleep routine was influenced by what their parents or siblings were doing before bed. For example, if parents watched TV before bed, students would often watch as well. Some of these activities were described as just a part of the sleep routine, while in other instances, students described trying new practices and actively changing their sleep routine because they saw their parents doing it and wanted to be like them. One student described that they now take melatonin to go to bed because their father and brother had been doing it for a long time and it helped them sleep. Another student described that they started being active before bed because their dad started doing it:



Figure 2. “The Shaper”

So this one is like a kind of bike and you get it on and then you like move your legs kind of like a bike. But it doesn't go anywhere, and it also helps my legs and when I go to bed and stop moving them, they feel like relaxed and like all the energy is out when I'm done exercising. My – when my dad started doing it. Then I kind of wanted to do it, and ever since then I've been doing it before bedtime.

(P3, School A, Male, Age: 10, Grade: 5)

3.3.2.1 Technology use regulated in the home

Technology use was strongly regulated by parental involvement. Although students were often aware of the negative effects on technology on their sleep, they would continue to use technology if permitted by their parents. Students described using technology before bed if they were allowed to, even if they understood the negative consequences. Other students did not use technology before bed because they were not allowed by their parents. One student described their understanding of the possible

negative effects of technology before bed and the role of their parents in shaping their sleep behaviour:

On weeknights using electronics aren't really the best for me, because if I go on my electronics, it just makes me stay awake all night. And in the morning, I don't want to wake up. And yeah it doesn't give me enough sleep. [I stay up until]12 a.m. That's why on weeknights my parents usually put the timer on my phone, which would turn it off. (P15, School B, Female, Age: 10, Grade: 5)

Students described that their parents' rules around technology use was different on weekends in comparison to weekdays, and often recalled being able to watch TV or play their video games before bed on weekends. Students also described that if they were allowed electronics on weeknights, they would have to shut off their electronics at an earlier time on school nights in comparison to weekends. One student described that they would shut off their PS3 gaming console by nine on week nights in comparison to eleven on weekends.

Some students felt that using technology during their bedtime routine helped them to relax, and entertained them when they "had nothing else to do" (P27, School B, Female, Age: 10, Grade: 5). Students described that they sometimes use their TV with their Xbox in their room so that they would be able to watch Netflix before bed to relax and prepare to sleep. One student indicated that they had technology in their bedroom - "I have a PS4 at my mom's house, and a Nintendo switch at my dad's house" (P1, School A, Male, Age: 10, Grade: 5). Other students indicated that playing video games before

bed was fun and made them excited, and made it harder for them to sleep because they would have to calm down. Students described having a hard time stopping watching YouTube or playing video games because videos were interesting to them and held their attention. One student described their experience:



Figure 3. “I Have a TV That Helps Me Sleep”

[Student] Because it helps me sleep kind of, in a way.

[Interviewer] So how does it help you sleep?

[Student] If I have like nothing to do and I’m bored in my room and I can’t sleep, I watch TV till I do...Say if you’re tired like I obviously could watch TV until you fall asleep, I guess.

[Interviewer] Yeah. Or do you find that it, it keeps you awake?

[Student] Depends, so like noise or something, cause it could be louder, could be bright. Well if you’re at home and you come home from school, and you sit on your couch and you look at a wall and there’s TV on there, what do you do? (P31, School B, Male, Age: 10, Grade: 5)

3.3.3 School experiences shape positive sleep habits at home

Students described that their experiences at school helped them to build on their understanding of the importance of healthy sleep practices. ‘Be A Sleep Star’ was understood as “doing things that help you sleep” (P33, School C, Female, Age: 9, Grade: 4) – students reflected on their current practices in their sleep routine and why they were important for their sleep. In particular, students described that school experiences helped them to reflect on embracing a healthy lifestyle. Students understood this healthy lifestyle as calming down before bed, being physically active, and eating a healthy bedtime snack. These practices helped students sleep.

Students felt that learning about sleep in school helped them to reflect on why they should carry out healthy sleep habits at home. Students explained that learnings from school helped them to understand the importance of healthy sleep practices. Students recognized that they already do activities before bed that helped them sleep, but when they learned about it at school they then understood why it was important. For example, some students described that physical activities in the evening wore them out, and also described how in school they learned the link between physical activity and getting better sleep. Another example is from one student who noted that she always played the piano before bed to relax, but learnings at school made her more aware that it helped her sleep:



Figure 4. “A Soothing Song”

[Student] And the reason I took this, is because it soothes me. When I play the piano.

[Interviewer] Did you know, or did you think that maybe playing the piano affected your sleep at all, or no?

[Student] No not until I started to be very aware of what my sleep schedule was [from school]. Then it started to affect my sleep, in a good way. Yeah I practice more because my hands would probably get fidgety in my sleep. And when I play piano it usually drains [the energy] out. (P6, School A, Female, Age: 9, Grade: 4)

3.3.3.1 Calming down

Students described having been read to from an early age and having learned to calm down before bed, but described that they learned about the importance of reading before bed in school as well. Students felt that they needed to calm down and relax before bed in order to have a good sleep, and learned the importance of calming activities in

school. Students recalled that journaling, making art, reading, and listening to music helped them to be mindful and calm, and would give them “nice dreams” (P20, School B, Male, Age: 10, Grade: 5). One student mentioned that reading distracts their mind from other troubles that might be happening. One student remembered how they wrote in a journal from an early age, but learned in school that relaxing and de-stressing before bed helped you sleep:



Figure 5. “Writing”

[Student] Yeah, just write about a story if you can’t get sleep.

[Interviewer] So is that something you do a lot?

[Student] I like to write comic stories, mostly comics now, but yeah. I started making books and comics since about I think I was four.

[Interviewer] And why did you take this photo?

[Student] To show that it can help you uh destress. And help you go sleep, cause I kind of – you’re kind of tired, you’re like writing a book, like nice and calm.

[Interviewer] Yeah. And is any of that stuff that you do at home, do you feel like you learned about it at school?

[Student] I learned that I can relax and de-stress, and make you go to sleep at school. (P29, School B, Male, Age: 11, Grade: 5)

3.3.3.2 Being physically active

Students described learning more about the importance of physical activity before bed in school and that school experiences made them reflect on why being active in the evening was so important for sleep. Students described that they learned about the effect of physical activity on sleep from a young age, as they were often involved in sports and activities growing up. Physical activity was an important part of their sleep routine as it made them tired, worn out, and relaxed. One student described how physical activity is part of their lifestyle and they now understand how it affects their sleep:



Figure 6. “Doing Exercise before Bed”

Because I – those are my shoes I wear when I go play badminton on Wednesday’s and that it’s like getting exercise. So then I get tired and it seems to help me fall asleep faster. Same thing with swimming. Yeah [I learned from school that] doing exercise before you go to bed and you, you’d be more tired. (P4, School A, Female, Age: 10, Grade: 5)

3.3.3.3 *Choosing a healthy bedtime snack*

Students remembered having a healthy bedtime snack since they were young, but learned about the importance of healthy snack before bed from school recalling that “you can’t really sleep, without enough food” (P15, School B, Female, Age: 10, Grade: 5). Students chose healthy bedtime snacks because eating healthy was not only seen as important, but also helped to get a good night’s sleep. One student recalled that they “sometimes have a snack like an apple so that when [they] go to sleep, [they] feel healthy” (P45, School C, Female, Age: 10, Grade: 4). Students described that they could not sleep on an empty stomach and ate an evening snack so that they “didn’t have a craving while [they’re] going to sleep.” (P2, School A, Female, Age: 9, Grade: 4). Students mentioned fruits such as apples, bananas, and oranges as a healthy snack, and water, milk, and tea as common drinks they had before bed. One student described why they had a healthy snack before bed and learning about it at school:



Figure 7. “Bedtime Snack”

I think – I think because it’s good to have an apple before you go to bed because it has lots of vitamins and helps your body grow more, [and] because your body

grows more by sleeping than being awake...I've been doing this since I learned [from school] like since grade two. (P7, School A, Female, Age: 10, Grade: 5)

Students indicated that through school they learned about avoiding caffeine and sugar before bed. Students expressed that they often had rules around not consuming caffeine and sugar before bed, but learned why this was important in school. Students indicated that they learned that sugar and caffeine can make you stay up later and make it difficult to fall asleep. Students provided examples of drinks that have caffeine (e.g., coffee, pop, and black and green tea) and sugar (e.g., candy). As one student described:



Figure 8. “Don’t Drink Caffeine before Bed”

I chose this [photo] because you shouldn’t be drinking caffeine before bed, because you could be all hyped up and it’s not very good for you before – when you want to go to bed...When we discussed in class, this is one of the things in the sleep study that we shouldn’t do before bed. (P21, School B, Female, Age: 10, Grade: 5)

3.3.4 Students translate sleep promotion home if they think it is useful to the family

While some students shared what they learned at school with their family, others chose not to. Some students expressed that they shared information about sleep at home to help their family have healthier sleep so that they could be more healthy overall. Students also shared with family because they wanted their family members to be aware of sleep habits that were not healthy for them. Students explained that they chose to share information about sleep if they thought it was relevant. Students who chose not to share what they learned at school with their family members described that either their family already had healthy sleep habits or they felt like their family would not listen or support them.

3.3.4.1 Wanting their family to be healthy

Some students identified unhealthy sleep practices in the home and were willing to share healthier sleep habits with their family. To improve family sleep behaviours, one student recommended that their family “read books before they go to bed instead of watching [the] TVs” (P23, School B, Female, Age: 10, Grade: 5). The awareness of healthy sleep practices helped students to translate and communicate these ideas home. Another student explained how they observed their family members engaging with electronics before bed and communicated the potential health consequences:

I told my mom and then my mom told my little sister. I was telling her about like if, like especially my older sister, she watches phones like a lot and TV. I told her like if you watch like your phone at night, under your bed, right, that your eye like

could damage or like get blind, whatever. (P11, School A, Male, Age: 10, Grade: 5)

Students discussed an awareness of their siblings sleep habits. Students described that they sometimes had to manage their sibling and felt responsible for their younger siblings to get a good sleep. Students said that they shared learnings about healthy sleep habits with siblings because they know that sleep is important and they cared about their siblings. One student commented that they wanted their sibling to improve their sleep behaviour so that they would be smart when they grow up. Older siblings tended to tell younger siblings about ways to improve sleep habits. Students reported that they tried to teach siblings that sleep is good for them and that “[their family] would have good dreams” (P10, School A, Female, Age: 9, Grade: 4) if they had healthier sleep habits. Students shared with their siblings the importance of sleep and giving tips for sleeping, such as changing sleep positions or going to bed earlier. Students also indicated that they shared healthy sleep habits at home because improved sleep could improve the overall health of the family, including family dynamics and that their siblings would be nicer to them. As one student shared:

I kind of have a better sleep when I do read before; cause it makes me have like better dreams....My sister doesn't really want to go to bed when she's supposed to, I sometimes say [reading] helps you sleep better. I – I kind of like tell her that she has to go to bed so she won't be grumpy in the morning, and so she'll have a good day. That's what I say to her. And she'll go to bed. Yeah cause then like it makes her like be nicer to me. (P32, School C, Female, Age: 10, Grade: 5)

Another student gave an example of a time that they shared with their family the importance of going to bed early in order to get enough sleep:

[Student] I shared with my mom. And my cousins, and I like to share that they should not go to bed like at like 12 o'clock, and then like wake up at 7 cause that's not enough time. [It's important] to go to bed a certain time that you feel comfortable with some stuff that help make you comfortable. (P33, School C, Female, Age: 9, Grade: 4)

3.3.4.2 Choosing not to share

Students who did not share what they learned at school with their family often indicated that it was not relevant to their family. One student described that they chose not to share about the effect of technology on sleep with their family because their family did not use technology before bed. Other students described not sharing with family because they felt their family already knew everything. Students also felt that younger siblings would either not understand, or their sleep habits would be too different. If students had older siblings they often felt that their siblings would not listen to them, or that they were already practicing healthy sleep habits. Another reason that students chose not to share healthy sleep habits at home was if they felt their parents would not listen to them, or they believed that their parents would not change even if they told them. As one student described:

With my brother cause usually he stays up on his phone till my mom goes to bed, so then he could go downstairs and watch TV. But then I told him he shouldn't do that because then you're not getting enough minutes/hours of sleep that you do need. And you need those hours of sleep and I did tell him you're older than me, you should know this stuff and I shouldn't be telling you this. But you shouldn't be on your phone all the time before bed. And you should not go on the TV because that's just a bigger and brighter screen. Usually he doesn't really listen to me. (P30, School B, Female, Age: 10, Grade: 5)

3.3.5 Summary of Findings

Students perceived that sleep was healthy for the body and brain. Sleep was described as helping students to think clearly, focus, and pay attention. Students indicated that sleep was important for their mood and relationships, as well as for their growth and development. Students felt that sleep habits were rooted in the home environment and that their parents helped to make them feel comfortable and safe. Parents were involved in student's sleep routines and often guided them through their bedtime routine. Students expressed that they would do the same activities as their parents before bed. For example, if their parents watched TV before bed, then students would often be involved and watch as well. Although students were aware of the negative effects of technology on their sleep, they would continue to use technology if permitted.

Students discussed that their experiences at school helped them build on their understanding of the importance of healthy sleep practices at home. Students felt that learning about sleep in school helped them to reflect on why they chose to carry out behaviours. In the eyes of students, a healthy lifestyle was seen as beneficial to help them

sleep, and students described calming down, being active, choosing a healthy bedtime snack, and avoiding caffeine and sugar before bed as components of a healthy lifestyle that helped them sleep. Students recalled learning about limiting electronic use at school as a way to help them sleep. Students expressed that they chose to translate sleep behaviours to the home if they thought it was useful to their family. Students wanted their family to be healthy; however, students would only share information they learned at school about sleep if they thought their family could use the information, or if it was something their family didn't already know and practice these sleep habits in the home. Students also decided not to share if they felt their family would not listen or support them in changing habits.

3.4 Discussion

There is insufficient evidence to support school-based sleep interventions that only target individual behaviours and do not consider into the wider influences of the school and home (Gruber, 2017). For this reason, school-based sleep promotion initiatives that take a CSH approach may be more effective in addressing child sleep by cultivating home, school, and community partnerships. Recent research indicates that involving family, community, and school staff has promising results in altering student sleep behaviour (Gruber et al., 2016). Therefore, the use of a CSH framework could be used to encourage students to make positive lifestyle changes in the home environment. Students have also been shown to drive changes in the lifestyle behaviours (i.e., healthy eating and physical activity) of family members and actively involve parents in their health decisions (McKernan et al., 2019). The idea that students can bring information from the school to the home is not new; however, what is novel is understanding how students

initiate change in the home and involve their families in this process. This concept has yet to be explored within the realm of school-based sleep promotion. Thus, the present study focused on understanding the mechanisms by which school-based sleep promotion transfers to the home environment and engages the family. More specifically, we aimed to determine if/how students acted as change agents and initiated sleep behaviour changes in the home. Our findings demonstrated that students have knowledge of the importance of sleep and reflected on their current sleep practices in light of school experiences. The home environment strongly influenced the extent to which healthy sleep behaviours were carried out in the home.

In our study, we found that students were knowledgeable of the broad effects of sleep on their health, and explained the importance of sleep for attention, focus, school performance, mood, peer relationships, and physical development. Students attributed this knowledge to experiences both in school and at home. As a result of this knowledge, students expanded their understanding of sleep practices in the home. Students described learning more about healthy sleep practices such as calming down before bed, healthy eating, and physical activity, while reflecting on the negative effects of unhealthy sleep practices such as engaging in electronics. However, students did not report making changes to these sleep behaviours. These findings are consistent with previous reviews of school-based sleep interventions in adolescents – most studies demonstrated improvements in sleep knowledge but little to no change in sleep behaviour, with few exceptions (Cassoff et al., 2013; Gruber, 2017). We suggest that translating school-learned sleep behaviour to the home is subject to different barriers when compared to similar interventions with a focus on physical activity or healthy eating. It has been

shown that role modelling is an important component of school-based health promotion interventions (Roberts et al., 2016; Storey et al., 2016). However, it is understandable that healthy sleep behaviours cannot be modelled in the school environment and therefore may be more difficult to translate home. Common behavioural change strategies such as role modelling, and praise and reinforcement are most typically implemented in the home (Nixon et al., 2012). In response to the inability to change students sleep behaviours, studies have proposed interventions that target individual behaviour change through motivational interviewing and self-efficacy assessments, with short-term improvements in adolescent sleep practices (Cassoff et al., 2013). Our study provides a possible explanation for why sleep education programs have demonstrated little to no changes in sleep behaviours. Indeed, our study supports the need to move beyond the classroom to include the home environment. The findings of this study suggest that the integration of multiple critical learning environments into school-based sleep promotion initiatives may improve child sleep behaviour.

Students expressed that they expanded their knowledge of sleep through school experiences. Importantly, students attributed sleeping well to embracing a healthy lifestyle. Students indicated that it was important for them to calm down before bed and feel safe, comfortable, and secure; these findings are supported by other research where children described that they needed a comfortable bedroom and parental soothing in order to sleep well (Golem et al., 2019). Students also described HEAL behaviours as an important part of their sleep, and we found that students understood the impact of HEAL behaviours on their sleep. Emerging research emphasizes the importance of the entire movement continuum throughout the whole day. The Canadian 24-hour Movement

Guidelines are grounded in a holistic perception of health (Carson et al., 2016; Tremblay et al., 2016) and recognize the relationship between sleep, sedentary behaviour, and physical activity. This aligns with findings from the present study as students described their sleep health by assessing the combination of other health behaviours, such as HEAL. It is important to note that sleep onset may be negatively impacted by being physically active too close to bedtime (within 2 hours of bedtime) in adolescents due to increases in body temperature (Joshi et al., 2016; Master et al., 2019). Our results indicated that students understand physical activity as important for their sleep, however, students may not understand that physical activity too close to bed may make falling asleep more difficult and reported being active throughout all stages of the day.

Our findings support the concept that sleep behaviour is strongly rooted in the home environment. As such, parents must be involved for learnings from school-based sleep promotion to translate home. This finding is supported by previous literature that emphasizes the impact of the home environment in shaping child sleep behaviours (El-Sheikh & Kelly, 2017) and the role of parents in setting rules that enforce healthy sleep practices (Buxton et al., 2015). Role modelling of parents in shaping health behaviours has been well-established in the literature (Haddad et al., 2018) and our study is no exception. In our study, students described that their parent's involvement in their bedtime routine significantly shaped their behaviours. Students were often involved in activities with family and siblings, regardless of the impact on their sleep health. For example, parents and children often engaged in TV watching together before bed. As well, students reported that they chose not to share sleep information learned at school with their family if they felt their family would not listen. Thus, a lack of parental support

in altering sleep behaviours in the home may diminish student's efforts to incorporate healthier sleep habits into their lifestyle. While students did bring messages of healthy sleep habits home, they appeared to be more influenced by their home environment and appeared to have less influence on their family sleep behaviours in comparison to our team's previous study on the translation of HEAL behaviours home (Mckernan et al., 2019). In the present study, it appears that students may be more likely to be influenced by home sleep practices than HEAL practices. The reasons for this are unclear, however, students in our study did not appear to have strong autonomy over their bedtime routine, as students generally described following their parents guidance. As sleep behaviour is strongly influenced by culturally embedded practices within the home, students may have lower autonomy and decisional ownership with sleep practices (Giannotti & Cortesi, 2009).

Technology use at bedtime is pervasive in North America, with well-established negative effects on children's sleep (Chahal et al., 2013; Twenge et al., 2019). In our study, students were knowledgeable of the effects of technology in keeping them awake and engaged. However, students frequently used technology at bedtime if permitted by their parents, regardless of their knowledge that technology had a negative effect on their sleep. This finding is consistent with previous literature describing that parents are strong mediators of their children's technology use in the home; children tend to use screens more often when they have fewer rules around electronics (He et al., 2010; Jago et al., 2012; Warren, Gerke, & Kelly, 2002). In our study, students described that they primarily used technology before bed to avoid boredom and to help them relax. This finding is similar to a study completed by He et al., (2010) which cited that children engaged in

screen-related activities for entertainment, spending time with family, and boredom. Students in our study also indicated that they did not want to watch TV before bed because it could scare them or give them nightmares, give them headaches, cause eye strain, or that they would be too distracted to fall asleep. Smahel et al., (2015) echoes these findings as children in their study described sleeping problems as a result of technology use before bed. However, children in their study described that they would be aggressive after playing games, of which our study did not replicate. These findings demonstrate that technology use is strongly rooted in the home environment.

Importantly, students voiced that they chose to share what they learned at school about sleep with their family because they wanted their family to be healthy. Students also cited reasons for not sharing if they did not feel like the information they had was relevant to family members or if they believed their family members would not listen. Our goal was to understand how students acted as change agents and initiated sleep behaviour changes in the home, therefore it was necessary to understand reasons why students decided whether or not to share sleep information with their family. To our knowledge, no previous studies have assessed why students translate sleep information learned at school to the home environment. Similarly, it is important to explore this concept to inform our understanding of why students choose to enact certain behaviours in the home over others. If we accept that students have autonomy, then we must seek to understand their capacity to make rationalized decisions. Overall, this finding is key to understanding why children may choose to share sleep learnings with their family as it can influence healthy lifestyles in the home environment.

3.4.1 Strengths and Limitations

There are strengths and limitations within this research project. This research was limited by the timeframe of the project which may have resulted in recall errors by students. Students participated in the first researcher-led brainstorming activity approximately 2-3 weeks before their interview. Due to the length of time between the first activity to the interview, students may have experienced recall errors in describing their photos. As well, students may also be subject to desirability bias and it is possible that children may vary their reporting of health behaviours and attitudes, as demonstrated in previous studies on self-reported diet and physical activity (Klesges et al., 2004). As well, member-checks were performed in a classroom setting and may have had an effect on student's responses. Students may not have felt comfortable speaking in front of their peers and may have altered their responses or chose to not participate in group discussions. Some research suggests that children between 9.6 and 11.2 years may not be competent to decide on research participation in clinical research due to differing levels of maturity (Hein et al., 2014; Hein et al., 2015). As the participants in this study averaged an age of 9.75, it could be assumed that some children who participated may have had differing levels of maturity and a different understanding of the intention of the research project. Lastly, we recognize that the researcher situated themselves within a westernized lens and promoted sleep practice guidelines that best suit a eurocentric viewpoint. We recognize that children's sleep is shaped by various socio-political and environmental factors (e.g., socio-economic status, race/ethnicity, gender, cultural and family traditions) and the diverse cultural heterogeneity within the Canadian population

results in varying perceptions of sleep that are not represented within this research project.

Alternatively, this research demonstrates strength through qualitative inquiry into the lives of students. Minimal amounts of school-based sleep promotion research highlight the voice of school-aged students and qualitative research was required to address gaps in understanding of nuanced student sleep behaviour in the home. The findings of this research gave considerable depth and understanding into the translation of sleep promotion learned at school to sleep behaviour in the home through the use of photovoice as a data generation strategy. In this study, photovoice was a useful strategy to explore child health behaviours in the classroom environment and allow students to genuinely communicate and shed light on their sleep experiences in the home (Carnahan, 2006; McKernan et al., 2019; Spencer et al., 2019). The researcher established credibility through prolonged engagement with students as the research team visited the schools frequently and interacted with students and teachers on multiple occasions.

3.4.2 Conclusions and Implications

In conclusion, our results that have promising implications for school-based sleep promotion initiatives. The results suggest students have a comprehensive understanding of the importance of sleep for both the body and brain. Students reflected that school experiences helped them build on this understanding of sleep, and helped them reflect on components of a healthy lifestyle. Furthermore, students are embracing that other lifestyle behaviours (physical activity and healthy eating) relate directly to their sleep, and this understanding aligns with current policy guidelines (the 24-Hour Movement

Guidelines) that endorse holistic interpretations of health. Overall, these results indicate that APPLE Schools is impacting student's conceptualizations of sleep in a positive way through active learning opportunities within the school and supporting children's holistic interpretations of health.

Our findings give direction for future policy and practice within school-based sleep promotion initiatives. Students described that their family played a vital role in shaping their sleep behaviours. It is recommended that future school-based sleep promotion initiatives incorporate learning resources that actively engage the whole family such as interactive games/home sleep challenges. By taking an additional step to involve parents, these activities may improve parent participation in such initiatives and may strengthen the utility of current school-based sleep promotion initiatives. Specifically, our study found that parents are key in regulating technology use in children. Thus, learning resources may be more beneficial if there is a focus on child/parent technology use. Inclusion of these learning resources may allow parents the opportunity to further integrate into healthy school culture, resulting in successful sleep interventions that are reinforced both at school and at home. Additional research is warranted to build upon the strengths of the CSH approach with regards to children's sleep, and to further investigate the effects of school-based sleep interventions that are able to innovatively engage parents to promote sleep learnings beyond the school walls. In addition, we acknowledge that further inquiry is required to explore the promotion of decolonizing educational frameworks within evidence-based education.

CHAPTER 4: PARENT PERSPECTIVES OF SLEEP IN THE HOME: SHAPING HOME-SCHOOL PARTNERSHIPS WITHIN SCHOOL-BASED SLEEP PROMOTION INITIATIVES

4.1 Introduction

Sleep is an essential component of a healthy lifestyle in children, however, declines in child sleep status warrant investigation and promotion of effective health promotion interventions (Matricciani et al., 2011; Tremblay et al., 2016). Comprehensive school health (CSH) is an approach that prioritizes school, home, and community partnerships to reinforce health behaviours, including sleep, across environments where children “live, learn, and play” (“Comprehensive School Health Framework”, n.d). Although interventions taking a CSH approach have proven effective for improved healthy eating, active living, and academic outcomes, sleep promotion has received minimal research attention (Tran et al., 2014). Furthermore, parent participation is essential in implementing effective sleep interventions; families substantially shape beliefs around sleep and can either reinforce or act as a barrier to healthy sleep practices in the home (Acosta et al., 2020). Home-school communication and collaboration are pivotal to the success of the CSH approach, however, parental participation in school-based initiatives is often limited (Epstein, 1984). Overall, it is currently unknown if parents support school-based sleep promotion, and would support the translation of these lessons learned at home. As such, it is important to explore parent’s perceptions of sleep, their view on the role of the school in promoting sleep, and ways that parents facilitate or act as a barrier to their children’s sleep.

Although multiple environments influence child sleep, the home is arguably the most important (Spilsbury et al., 2005). Parenting style, beliefs, and practices affect child sleep (Acosta et al., 2020; Tyler et al., 2019). The effect of home influences on child sleep behaviour is apparent when differing parenting practices have varying effects on child sleep health. For example, parental presence and soothing in the bedtime routine may increase sleep-reported problems (Sadeh et al., 2016). In contrast, parental consistency in enforcing child sleep routines decreases the likelihood of bedtime resistance (Noble, O'Laughlin, Brubaker, 2012). Importantly, parents may have differing perceptions of sleep behaviour and may be unable to differentiate when a child's sleep behaviour is potentially harmful to their health (Owens, 2005). Thus, parent's knowledge and perspectives regarding their child's sleep may directly impact child sleep and health. Alternatively, parents who improve their sleep knowledge through health promotion programs may promote healthy sleep habits in the home (Agaronov, 2018; Rea et al., 2016). Thus, school-based sleep promotion interventions must consider parent sleep knowledge and practices, as well as the influence of parents in supporting healthy sleep behaviour in their children.

Research concludes that engagement of parents in health promotion interventions aids in successful implementation (Cross et al., 2018; Shackleton et al., 2016; Storey et al., 2016; "The 4 Components of Comprehensive School Health", n.d). However, there is limited understanding of how parents conceptualize their involvement in school-based health initiatives, prompting new research that highlights the parent voice (Santiago et al., 2016; Spencer et al., 2018). Establishing parent engagement in school-based health promotion may be challenging due to parental reported barriers (Spencer et al., 2018).

Parents may experience barriers to participation such as lack of child care, inability to get time off work, transportation issues, or feeling unwanted by the school (Redford et al., 2019). School culture that normalizes parent involvement can support child achievement as teachers are often provide opportunities for parent inclusion (Hornby & Lafaele, 2011). Overall, parents have valuable insight and knowledge that can strengthen school programming (Epstein, 2018; Park et al., 2017). This insight is especially true for school-based sleep promotion initiatives, given the strong influence of the home (Acosta et al., 2020). Therefore, parent involvement in the planning, implementation, and evaluation of school-based sleep promotion initiatives to create suitable options for participation beyond school walls. This research will contribute to the field of school-based sleep promotion, with a particular focus on the role of the home environment. Assessing parent’s knowledge and responsiveness to school-based sleep promotion allows for informed development of school-based sleep promotion strategies, ensuring that parental involvement is more likely, thus improving the likelihood of success. The purpose of this research was to explore parent’s perspectives on sleep behaviours and how parenting practices facilitate and support, or act as a barrier, to their children’s healthy sleep behaviours.

4.2 Methods

4.2.1 Descriptive qualitative method

This study employed a descriptive qualitative method. A method of naturalistic inquiry, the descriptive qualitative method aims to understand “complex experiences, events, or processes that are embedded within the human context” (Sullivan-Bolyai et al. 2005). Qualitative descriptive research is described as having descriptive and interpretive

validity as the researcher stays “close to the data” through summarization of participant experiences (Mayan, 2009; Sandelowski, 2000; Sullivan-Bolyai et al. 2005). This method was used to explore parent perceptions of sleep behaviour in the home in order to provide clear and approachable information to enhance school-based sleep promotion. Rich descriptions are highly detailed, in-depth narratives that help the reader understand a setting or situation (Creswell & Miller, 2000). These rich descriptions can easily translate to key stakeholders and knowledge users in the area. This study was coordinated by a master’s student (School of Public Health) with the guidance of an experienced qualitative researcher (school of public health) and committee members with relevant expertise and knowledge fitting the research scope (1 professor in the department of occupational therapy, 1 professor in the department of secondary education). The student has experience in qualitative methods and was present for all participant interviews in this study. The student conducted all interviews with the exception of two which were carried out by a fellow master’s student in the same program of study.

4.2.2 Participants and ethics

25 parents of school-aged children (ages 5-12) were purposively sampled from across Alberta, Canada. Parents resided in Northern Alberta (Edmonton, Peace River, Grande Prairie) and Southern Alberta (Calgary, Drumheller) and were all female with an average age of 39 years (SD: 4.58). Their children ranged from Kindergarten to Grade 6 and averaged 8.3 years old (SD: 2.01). Parent-reported average child bedtime was 8 pm (SD: 0.48) on weekdays, and 8:30 pm (SD: 0.84) on weekends. Average wake up time was 6:45 am (SD: 0.42) on weekdays, and 7:15am (SD: 0.78) on weekends. Children’s

sleep duration averaged 10.8 hrs on weekdays, and 10.6 hrs on weekends. Parents were recruited through existing stakeholder connections within provincial partner networks, including APPLE Schools and Alberta Health Services. Parents were recruited through posters, newsletters, online postings, and word of mouth. Maximum variation sampling (a form of purposeful sampling) was utilized to allow for phenomenal variation to accurately represent diversity across the sample (Sandelowski, 1995). As this project fits within the scope of a larger initiative aiming to improve school-based sleep promotion across Alberta, it is useful to include parents of school-aged children within Alberta as a whole. Each parent read and signed the information letter and consent form prior to their participation in the research project (Appendix F). Ethical approval was granted through the Human Research Ethics Board at the University of Alberta [Pro00078831].

4.2.3 Data generation

Each parent participated in a one-on-one semi-structured interview. Interviews took place in a public space (e.g., coffee shop, mall) or over the phone. The interview guide (Appendix G) was informed by key knowledge users within the field of school-based health promotion and University of Alberta researchers with expertise in the area. Interviews were centered around parent's perspectives and practices for sleep in the home, and the role of schools in promoting healthy sleep habits. Field notes and observations were also used in combination with interviews to contribute to the richness of the data and align with a descriptive qualitative method (Mayan, 2009; Sullivan-Bolyai et al. 2005). Observational notes were taken during the interview and immediately after to ensure that initial interpretations were recorded. Field notes often include information about who is there, what is happening, where the interview is located, and how

individuals interact (Mayan, 2009). The researcher compiled field notes to use throughout the analytic process. Field notes contained objective information (date, time, location) and subjective interpretations (reflections, feelings, interpretations).

4.2.4 Data analysis

Interviews were audio-recorded and transcribed verbatim by a professional transcription service. Transcribed interviews and researcher field notes were imported into NVivo12 qualitative organizational software (Richards, 1999). Data were analyzed after each parent interview and initial thoughts and interpretations were recorded. Field notes provided essential information about the contextual environment of participants' experiences and were incorporated into data analysis procedures (Phillippi & Lauderdale, 2018). Latent content was used to identify meaning units and to describe parents' understandings of sleep behaviour in the home and school-based sleep promotion (Downe-Wamboldt, 1992). Transcripts were read and reread to identify meaning units and assigned individual codes with descriptive inclusion criteria. Codes were then categorized and re-categorized to reveal relationships within the data (Miles & Huberman, 1994). Transcripts were read to ensure subcategories and codes were consistent with the theme meaning, and categories were separated when distinct ideas were identified (Mayan, 2009). All data analysis was conducted by the researcher who debriefed with a member of the research team throughout to ensure accuracy of interpretations (Koch, 1994). Consistent with qualitative description, the researcher stayed close to the data to provide a clear, rich description that could be easily interpreted and applied to inform practice (Sullivan-Bolyai et al. 2005)

4.2.5 Rigour

This research was conducted in an iterative nature to allow congruence among all aspects of the research process (Krefting, 1991). The researcher was responsive at each stage to ensure methodological coherence was achieved. Rigour was established using four criteria established by Guba & Lincoln (1982): credibility, transferability, dependability, and confirmability. Credibility ensures that results are accurately representative of the data (Mayan, 2009). In this project, credibility was achieved through in-depth participant interviews and researcher responsiveness. During each interview, parent responses were thoroughly explored by asking probing questions. Responses that caused confusion for the researcher were reintegrated into the conversation to verify the researcher's understanding of concepts. The researcher's initial interpretations or hunches were continuously verified or discredited as each parent was interviewed. The researcher also debriefed with a critical friend to test emerging hypotheses (Lincoln & Guba, 1986). Negative cases were identified and analysed to create a rich, and detailed description of parents' differing views of sleep and school-based sleep promotion. New categories were created or categories were dissolved to reflect a new conceptual organization of the data with the inclusion of negative cases.

4.3 Results

The following themes emerged from the analysis: (1) sleep is valued and supported, (2) recognition of barriers to healthy sleep, and (3) schools are allies in promoting sleep. Parents perceived that sleep was essential for their child's health and facilitated healthy sleep practices in the home yet explained potential barriers that affected sleep in families. Parents supported school-based sleep promotion initiatives and described their

experiences with health behaviours learned at school transferring home, and also expressed value in sleep education in the school curriculum. Although parents were supportive of such initiatives, they noted factors that directly impacted the success of school-based sleep promotion.

4.3.1 Sleep is valued and supported

Parents strongly emphasized the value of healthy sleep practices and described their experiences supporting their child's healthy sleep habits in the home. Parents described that sleep was important for their child to function in everyday life, and believed that sleep was important for their child to do well in school, and to manage their emotions.

4.3.1.1 Parents recognize the importance of sleep

Parents believed that their child's sleep was important and illustrated how sleep had positive effects on their children. A poor sleep meant that children had problems focusing and were moody. Sleep was perceived to affect children's learning, attention, focus, and mood, and in turn, affected their child's ability to function in school and in everyday life. Parent's described that sleep was necessary for children to be able to manage their emotions throughout the day. One parent summarized this concept below:

Their brains are growing so fast they need to like, regroup and you know be able to absorb all that knowledge and grow, and be well rested, and I think it just affects everything. I think that sleep is just as important as eating healthy, right across the board they need proper sleep, cause if you don't have it you're

tired and you're cranky. And then you can't, you know, focus, perform well at school, or you just feel like crap. (P47)

Parents observed that poor sleep affects a child's ability to function and pay attention, and voiced that children who are well-rested can focus better in school and pay attention to the concepts they are learning in class. Learning problems were described as a potential consequence of being sleep deprived. One parent described that "if [the children] are having a good sleep, it reflects in school - they have more energy and they're more fresh at school" (P23). Another parent described how sleep difficulties in their child affected both behaviour and grades:

With our oldest child this fall we had [sleep difficulties] and it was affecting her school and we had to have a meeting with the teacher about how she was behaving in class. And it was directly linked to her fatigue. So for us it is of primary importance. It was – it affected her grades. (38)

Parents acknowledged how children's moods were impacted by poor sleep and recognized the emotional consequences of their child being tired. Parents described their children as cranky, moody, quick to anger, and unable to regulate their emotions when they did not get enough sleep. Parents felt that their children would be able to better manage and cope with their emotions if they had a good night's sleep. As well, parents cited the importance of sleep in their children and how it acted to regulate their child's ability to function and meet everyday life demands:

Yeah it seems, I can see it in her behaviour pattern, [my daughter is] more comfortable and a little less antsy about things. And not that, that's it's even an issue for her, but when it is, you notice it. She's more prepared for life stressors, if something comes up. She kind of manages better. (P27)

Parents also described if children slept well there would be “far less mental health problems, learning problems” (P40). They also stated that coping and resiliency would improve dramatically. Another parent described that once their children started sleeping well they were better equipped to focus and do schoolwork, and this change had a significant impact on their well-being. This parent recalled that sleeping well “had a huge impact” on their child and caused improvements in their child’s “maturity as well as education” (P43).

4.3.1.2 Parenting practices support healthy sleep behaviours

Parents identified practices that facilitated healthy sleep behaviours in their children. This included setting and enforcing rules, and establishing a consistent bedtime routine. Parents described that setting and enforcing rules was crucial in developing healthy sleep practices for their children. As well, parents described that children who had clear rules and expectations understood what they should do when preparing for bed, and could have more independence with their sleep routines. Parents noted that it was important to establish rules when children were young. One parent remarked that it would be difficult to establish new rules and a routine if your child was used to different rules.

Parents also mentioned that they helped their children sleep by getting them nightlights, fans, comfortable bedding and pillows. One parent used a Gro-clock™ to help their children understand when to go to bed and when to get up:

They have a Gro-clock™ in their room, so they have to stay in their in their bedrooms until the morning, until their Gro-clock™ comes up. Yeah it works great so that's kind of – that's the rule, once they're in bed they stay in bed until, until the clock goes off... [The children] go to bed, door is shut by 8:30 and then we don't see them again – our six year old will sometimes be up earlier, but he just stays in his room. So he'll be up anywhere between seven and eight, and then the other kids are basically eight o'clock. (P36)

Parents recalled that establishing a consistent routine helped to facilitate their children's healthy sleep behaviours. One parent mentioned that to set their child up for success they needed to “have a routine...and consistency in what they do for the routine” (P40). The bedtime routine was viewed as easier if their child could anticipate what their routine leading to bedtime would look like, and would cue the children to relax and prepare for sleeping:

I find that he's able to function a lot better with structure. So he knows what's going on, he's doesn't get anxious about anything, he knows what to expect. He can tell you the order that everything happens. When he gets home, he knows what he should be doing [in his bedtime routine]. There's no deviation.” (P20)

4.3.2 Recognition of barriers to healthy sleep

Although parents valued sleep behaviours in the home and carried out practices to support sleep in their children, they described lifestyle factors that negatively contributed to healthy sleep hygiene in the home. These lifestyle factors were described as having a busy lifestyle and not prioritizing sleep as a parent.

4.3.2.1 Busy lifestyle

Parents described that there are “times where we’re just go, go, go, and we’ve been so busy in the evening” (P13) and this busy schedule caused their child to go to bed at a later time. Parents described that it is “chaotic when there are [commitments] after school, and by the time you get home, have dinner, it’s just a little bit later” (P52). One parent described that weekends were especially affected by commitments and this affected their children’s likelihood of going to bed on time:

I should say on the weekends, well we try to keep it consistent on the weekends, but the weekend’s become a little different depending on what’s happening activity wise. And so sometimes, like recently cause of Halloween parties, and we volunteer with our Community League, and there’s like events happening one weekend out of the month, usually. And so those nights we tend to be a little bit later. [My daughter] gets to by nine, maybe. (P27)

One parent described that other parents have so many activities for their children that it will cause them to run late in the evening routine. Parents felt that their children's sleep was often affected the most if schedules were too overloaded:

In our society I think people are so driven that they often forget...that sleep and working extra hour and losing extra things around the house [is] reducing their sleep hours. And keeping [the children] up and getting them to be like too busy, and their lives are so full, which is – it seems like such a great thing to provide kids fresh opportunities, but I think they miss the mark uh so about sleep by not putting the importance on sleep. (P40)

Parents described that if they had another hour in the day they could have their children's activities earlier and start the bedtime routine earlier, and help their children get a better sleep. Parents described that they are often over scheduling themselves, and overscheduling their kids. Overall, having a busy schedule was a barrier to sleep behaviour in children as it tends to keep children up later.

I think a busy – a busy schedule would definitely play a big part in that we have friends that have kids just a little bit older than my two youngest, and their hockey schedules are crazy. Like they have practices at 8 o'clock at night. And I'm like that's nuts for that age, by the time they get home and get to bed, it's like 10, 10:30, sometimes 11 o'clock. Like I think that's nuts for a kid that age, so I don't know, I think sports can definitely play a huge part in that. (P49)

4.3.2.2 Parents do not prioritize their own sleep habits

Parents lifestyle was recognized as a barrier to healthy sleep habits in the home, and they described that their sleep practices were often very different than their children's. One parent described that: "We're probably very bad role models. We tend to stay up later and wake up at the last moment" (P31). One parent described that parents do not set a good example to their children and the effect this may have on their children's sleep behaviour:

There's not one person that I know that's a parent that sets a good example of sleep. The fact that kids they do what they see, as opposed to what they hear. So unless they actually understand why they need sleep, and unless they can actually understand the difference that makes in their own life and see it themselves. They may not always listen, and it may be harder for them to get to sleep. (P20)

Parents also described themselves as not having "a good routine going to sleep" and "always so busy getting stuff done" (P28) that they do not have time to wind down and have a sleep routine. One parent described how parents could improve as role models for their children:

Because I think we're just so busy and nobody unwinds well. And you know, you know the parents are there scrolling on the phone or any of that sort of stuff. And then the kids see that, or they say we'll go to bed. Even though I'm sitting here

yawning and not taking care of myself too, right. Like I think it's definitely something that an entire generation of people are failing [to] sleep better. (P21)

Many parents cited having a TV in their room was negative role modelling. One parent said that parents are “fairly good role models, but probably the screen time would be the one that we're not doing great at, as adults” (P42). Parents thought that watching a screen before sleep kept them awake and disrupted their sleep and described knowing “a lot of adults don't follow the no technology rule before bed” (P13). Some parents mentioned falling asleep with phones on the bed or under their pillow:

Well I think even if we know that watching a screen before sleep keeps us awake and kind of disrupts our sleep patterns, we do it anyways. Most people sleep with their phones on the bed or under their pillow. (P42)

4.3.3 Schools are allies in promoting sleep

Parents viewed sleep promotion in schools as a valuable tool to reach children and provide education regarding sleep. As well, parents believed that children could learn about school and transfer these learnings to their family members in the home. However, parents believed that school-based sleep promotion initiatives required support from both the school and home in order to be successful.

4.3.3.1 Sleep promotion in school is valuable to reach children

Parents felt that sleep promotion in school was valuable and could help children learn how to improve their sleep. Parents described that learning about sleep in school

could become “a habit that would be good and healthy for them” (P22). Importantly, parents described that students could learn about healthy sleep habits on their own if the parents were not teaching it at home. Parents thought that if students were not “learning about [sleep] at home, then school would be a good place for them to hear it” (P39). One parent noted how sleep promotion in school is important to support families and the community:

But when you have parental and family structures like we do and we’re seeing more and more, with double working families, or things like that – the community, especially the school has a bigger role to play... I think if we’re putting things like sleep or nutrition, these things as part of our health unit, it’s really important. (P16)

One parent mentioned their view on the importance of integrating sleep into the classroom as a mechanism to reach more children:

I think it should kind of be something that gets mentioned, I mean they have health classes and stuff like that, so I think it’s definitely something that they can discuss in school cause not all parents are going to discuss that with their kids...I know that a lot of kids don’t get that from their parents, so I know that if the school were to help out a little bit teaching that, I think that it would be very good. (P52)

4.3.3.2 Sleep promotion at school can translate home

Parents believed that students who learned about sleep at school could bring this information home, and foster healthier sleep habits in the home. Parents noted that if the school placed value on sleep that it would help reinforce the importance of sleep in students. Parents suggested that students could then bring awareness of healthy sleep practices back to the home and engage the family:

I think [it's the] school's role in having those discussions and setting that value for sleep [that] can help students. Like if teachers are saying how important it is, and things like that, I think maybe that helps bring that conversation out to the home, so that their awareness is better than every – every – it's important for everyone and everyone's doing it. (P31)

One parent recalled their experiences changing their sleep behaviour before bed. Their child observed her watching television before bed and “talked about how making good choices for going to sleep and no TV, no technology should happen before bed” (P13). This prompted the parent to stop watching television. Another parent described that sometimes when their child would learn something that they were excited about, they would discuss it with their friends, and that this could help promote sleep at homes. In summary, sleep promotion in schools could translate home, as one parent recalled:

If the school is teaching it, it might make a difference, or the child can also relay that information to the parent. I think a lot of the kids that have behaviours or that do have issues in school, some of it could be due to sleep. (P20)

In addition, parents believed that school-based sleep promotion could only be successful if there was collaboration between the school and home. Parents recognized that sleep behaviour was carried out in the home environment, and that parents played a large role in shaping sleep behaviours in their children. One parent described that “if the school only pushes it, then the parent may not necessarily enforce it or agree with it” (P20), and this would not lead to sleep behaviour changes in the home. Parents needed to support their children to achieve healthier sleep behaviours in partnership with the school:

I mean it's on both – we've had this conversation at work where other people are like oh they're not learning that in school, well then it's the parents job to teach them some of these like life skills, right. So I think it's both, I mean it needs to be coming from both sources, parents – parents need to sort of reinforce maybe what's coming home from school – but I mean it's both school and parents. (P44)

Parents emphasized that both school and parents played a role, and if there was not enough parent buy-in it would not be successful. One parent mentioned the role that parents play in promoting sleep in the home:

[Sleep education] could definitely be part of the health, but I feel like it's the parents who need to set up the routine, then the parents who need to provide the sleep environment. And the parents who often need to stick to the children's schedules and like understand what it means. (P40)

Parents were viewed as the primary source of information for their children, and mentioned that schools could be a “partner in teaching healthy sleep habits” (P8). Parents discussed that potential limitations of school-based sleep promotion in that parents are there during sleep time and the school is not. Parents also discussed that kids were more likely to bring information home from school when they were excited about it, and this would might help parents work with kids to improve their sleep behaviour:

I think having it more fun for the kids, for them to interact, I think would make a huge difference; cause kids when they're excited about something at school and they bring it home, then they're excited to tell their parents and their parents tend to help them out a bit more because the kids are so excited about. (P52)

4.3.4 Summary of Findings

Parents indicated that they valued and supported their child's sleep in the home. Parents perceived sleep as important for their child's learning, attention, focus, and mood. A poor sleep meant that their child's grades might suffer, or children's mood would be impacted. Parents felt that if their child had not slept enough, it may affect their ability to cope with the demands of school and everyday life. In particular, parents cited that if

their children had poor sleep that their grades would suffer. Overall, parents viewed sleep as a significant factor that affected the health and well-being of their children.

Parents recalled practices that facilitated healthy sleep behaviours in children. Most prominently, parents felt that setting and enforcing rules and establishing a consistent bedtime routine were vital to help their child to sleep well. Parents indicated that they tried to establish rules with children when they were young, and wanted their children to have consistency in the routine so that they would know what to expect in their routine. Parents thought that the purpose of these practices were to give their children structure to help their child understand when to go to bed and when to get up. Parents believed that this would help children to be relaxed before bed and fall asleep faster.

Parents recognized the barriers that prevented sleep in their children. Having a busy lifestyle was described as a barrier that made it difficult to get their children to sleep on time. Parents cited that evening commitments and child activities most often interrupted the bedtime schedule. Parents also indicated that on weekends their family activities and commitments often varied, and this may cause their children to go to bed later than usual. In addition, parents felt that their own sleep practices were a barrier to promoting healthy sleep habits in the home. Since parents were unable to prioritize their sleep habits and recalled that they could not set a good example for their children. Parents were often busy themselves and lacked positive sleep hygiene practices. In particular, parents cited having a TV in their room as negative role modeling, and perceived that they did not follow similar rules around technology before bed in comparison to their children.

Schools were described as allies in promoting sleep. Parents thought that sleep promotion in schools is valuable to reach children. Parents saw schools as venues where

students could learn about healthy sleep habits, especially in cases where their own parents were not teaching them about sleep. Parents felt that the school and community can play a role in shaping student sleep behaviours, and viewed the classroom as a mechanism for change that would support children in learning about healthy sleep behaviours. Parents believed that students who learned about sleep at school would bring this information home. Parents believed that the school can promote sleep for the whole family if teachers emphasize the importance of sleep. Parents were hopeful that sleep promotion taught in schools can bring about conversations about sleep in the home. Parents recalled that their children have helped them make positive changes around their own sleep behaviour, and that students can relay sleep information to the parent. Overall, parents were receptive to school-based sleep promotion efforts and believed in the utility of such interventions in making a positive impact in the home.

4.4 Discussion

Parents undoubtedly shape their children's sleep practices in the home from a young age (Sadeh et al., 2010) and continue to influence their children through their elementary years (Cimon-Paquet et al., 2019). Parenting practices and parent-child relationships affect child sleep (Berniet et al., 2013; Mindell et al., 2015), while differing views of problematic sleep behaviour (Ramos et al., 2007) may cause children to chronically have inadequate sleep and suffer health consequences. In our study, parents demonstrated an accurate knowledge of the effect of inadequate sleep in their children. This finding is important, as parents appear to be aware of the potentially harmful effects of inadequate sleep in their children and have motivation to improve their children's

sleep behaviours. Parents reported that they thought sleep was valuable for their children's learning, development, attention, focus, energy, mood, academic achievement, and coping and resiliency; all these outcomes have been substantiated within the literature (Dutil et al., 2018; Gais et al., 2006; Smedje et al., 2001). As it is relatively new knowledge that inadequate sleep in children is strongly related to childhood obesity (Chen et al., 2008; Taheri, 2006), it is not surprising that parents did not readily recognize this. Overall, parents exhibited extensive knowledge of the effects of inadequate sleep in their children.

Parents described that they facilitated healthy sleep practices in the home to support their children's sleep. Parents named two practices that they found the most important to help their children sleep: (1) setting and enforcing rules, and (2) establishing a consistent bedtime routine. Both of these practices are well documented in the literature as useful practices to help school-aged children sleep better (Buxton et al., 2015) and suggest that parents in our study are well-informed of healthy sleep hygiene in comparison to parents in other studies (Owens et al., 2011). Parents addressed most sleep hygiene principles that are recommended by Chaput (2016), however parents did not refer to the role of regular exercise in promoting their children's sleep. Overall, parents in this study were well-informed of sleep hygiene practices that are consistent with current sleep recommendations.

Parents cited barriers to achieving healthy sleep habits in the home, and reported that their family's busy lifestyle limited their ability to establish a consistent bedtime routine and bed/wake times on weekdays and weekends. Commitments included after school activities and homework. As well, parents reported that they did not prioritize

healthy sleep practices themselves, and thus may role model negative sleep practices to their child. A U.S study had similar findings, and reported that extracurricular commitments as well as parent sleep practices were perceived by parents as a barrier to child sleep (Golem et al., 2019). It has been substantiated in the literature that extracurricular events and homework have a clear association with inadequate sleep in Chinese school-aged children (Li et al., 2014). Although there is literature that states the importance of parents as role-models for physical activity (Rodrigues et al., 2018) and healthy eating (Vaughn et al., 2018), the effect of parent role modelling on sleep practices is not strongly demonstrated in the literature. However, one study suggests that parents may decrease their children's screen time by reducing their own screen times (Xu et al., 2015). As screen time use before bed is negatively correlated to a child's sleep (Chahal et al., 2013), parents may indirectly improve their child's sleep behaviour by reducing their own screen time. Additional research is needed to explore the effect of parent role modelling on their children's healthy sleep practices, and investigate viable strategies to address parent-reported barriers to healthy sleep habits in the home.

Importantly, schools were described as allies in promoting sleep. Parents were responsive to school-based sleep promotion efforts and thought that sleep promotion in schools was valuable to improve child knowledge of sleep. Limited evidence exists that explores parent receptivity to school-based sleep promotion interventions, yet, parents have been found to support healthy school policy changes (Gillies et al., 2019). Studies that evaluate parent perspectives of school-based health promotion interventions have not included sleep and tend to focus on physical activity, nutrition, and sedentary behaviour (Patino-Fernandez et al., 2013; Van Lippevelde et al., 2011). This finding provides

valuable insight; parents are willing to be involved in school initiatives as they recognize that sleep must be reinforced in the home. Furthermore, school-based sleep promotion initiatives that involve parent education have resulted in positive changes in sleep behaviour in the home (Gruber et al., 2016; Hargadon & Downes, 2019). Overall, parents were receptive to school-based sleep promotion efforts and believed in the utility of such interventions in making a positive impact in the home. Parents also believed that their children would learn about sleep and bring this information home, and that this can promote sleep for the whole family. Research has found that children can act as change agents and bring school learnings home, and cause change in the home environment (Bresee et al., 2016; McKernan et al., 2019). Overall, the results of this study have demonstrated that parents are supportive of school-based sleep promotion initiatives; these findings have broad implications for home-school collaboration opportunities within school-based sleep promotion interventions.

4.4.1 Strengths and Limitations

Firstly, all of the participants identified as women. It is well established that mothers influence child sleep (Mindell, 2015), yet, the family can also influence sleep behaviours. For example, fathers, grandparents, siblings, guardians, and caregivers may also influence child sleep behaviours (Cimon-Paquet et al., 2019). Thus, the participants recruited may have not reflected the views of the whole family unit. As well, although the research team used a variety of methods to recruit parents, including posters, newsletters, online postings, and word of mouth, parents who reached out tended to vocalize that they reached out because they valued sleep in the home, and supported efforts to increase awareness of sleep in both the school and home. As the aim of the study was to

understand perceptions of sleep in parents of school-age children, it is possible that parents who did not value sleep or support school-based sleep promotion may have been unintentionally excluded from the sample. As a result, the sample may be biased towards parents who were motivated to ensure their children sleep adequately, and may not represent all parent's perspectives about sleep within Alberta, Canada. As well, 8 of the 25 parents were interviewed during the COVID-19 pandemic, and may have varied their responses as they experienced lifestyle changes. These changes may have affected their own sleep patterns as well as their children's. In anticipation of this, the researcher directed participants to describe their experiences that represented sleep patterns in the home prior to the start of the COVID-19 pandemic. Lastly, we recognize that the researcher situated themselves within a westernized lens and promoted sleep practice guidelines that best suit a eurocentric viewpoint. The diverse cultural heterogeneity in the Canadian population demonstrates that various socio-political and environmental factors (e.g., socio-economic status, race/ethnicity, gender, cultural and family traditions) affect sleep and some perceptions of sleep may not be fully represented within this research project. Alternatively, this research was strengthened in the purposeful sampling of parents across Alberta which allowed for diversity across the sample (Sandelowski, 1995). In the future, the results of this project will inform a larger initiative aiming to improve school-based sleep promotion across Alberta. Thus, it is useful to include parents of school-aged children from different jurisdictions across Alberta as a whole. As well, this research presents novel understandings of parent's perceptions of school-based sleep promotion initiatives, which have not yet been explored.

4.4.2 Conclusions and Implications:

This study provided novel insight into parent's perspective of sleep in the home. The purpose of this research was to explore parent's perspectives of sleep and practices that act as barriers or facilitators to their children's sleep in the home. Furthermore, this research was conducted as a means to explore parent receptivity to school-based sleep promotion initiatives in order to inform future program implementation and policy development. To the researcher's knowledge, this is the only study to explore parent receptivity to school-based sleep promotion initiatives.

The results of this study found that parents are well-informed of the importance of adequate sleep in their children and perceived that sleep was valuable and supported in the home. Furthermore, parents recalled numerous consequences of inadequate sleep in their children, and facilitated their children's sleep by setting and enforcing rules and establishing a consistent bedtime. However, parents discussed barriers to promoting healthy sleep practices in the home, namely, having a busy schedule and inability to prioritize their own sleep. Nonetheless, parents were receptive to school-based sleep promotion efforts and viewed schools as allies in promoting sleep in their children. School-based sleep promotion initiatives that include a parent educational component have been successful in improving child sleep behaviours (Gruber et al., 2016; Hargadon & Downes, 2019), and should be considered throughout implementation.

These results clearly demonstrate that parents are supportive of home-school partnerships as a means to improve child sleep behaviour in the home. As parents significantly shape their children's sleep behaviour, it is necessary that parents are supportive of school-based sleep interventions in order to facilitate program success.

While most school-based sleep promotion initiatives do not include parent involvement (Cassoff et al., 2013; Gruber, 2017), this research demonstrates that parents are supportive of student's school learnings about sleep and feel that they would encourage their children to share with them and help them to implement healthier sleep practices in the home. It is promising that parents believed that their children would share information at home and cause changes in the family. This study demonstrates that parents view school-based sleep promotion as a viable option for improving child sleep and are supportive of their children's school learnings, thus it is likely that school-based sleep promotion interventions will be successful. Additional research should explore the mechanisms by which parents decide to implement sleep information that is shared by their children, and how these sleep behavioural changes may be sustained within the home. In sum, involving parents within school-based sleep promotion interventions is paramount to support child sleep behaviours.

CHAPTER 5: CONCLUSIONS

5.1 Summary of Findings

The overarching aim of this thesis was to explore student's and parent's perspectives of sleep behaviour in order to inform school-based sleep promotion initiatives within Canada. Specifically, this research aimed to examine children's perceptions of their own sleep behaviour and determine if and how they translate school-based sleep promotion home. Parent perspectives provided novel insight into the home environment, and highlighted how parenting practices facilitate and support, or act as a barrier, to their children's healthy sleep behaviours. Altogether, these perspectives can be utilized to inform future school-based sleep promotion initiatives. This project highlighted how connections between the school and home are essential in fostering healthy behaviours in children. This is especially true when promoting healthy sleep behaviour, as sleep habits cannot be role modelled in the school environment and are carried out in the home. The home influences child sleep behaviour due to parental involvement in sleep practices from an early age (Meltzer & Montgomery-Downs, 2011), therefore the home and school environment can work in partnership to improve child sleep behaviour. It is essential to foster connections between these environments to promote healthy behaviour and academic success in students (Salinas & Epstein, 2004). Within the existing literature, it has been unclear why students are not enacting sleep behaviour changes in the home as a result of school-based sleep promotion interventions (Cassof et al., 2013; Gruber, 2017), and new research points to the importance of the fostering learning among parents, school staff, and community members (Gruber et al.,

2016). Furthermore, emerging research has established the mechanisms by which students perform HEAL behaviours in the home as a result of school-based health interventions (Mckernan et al., 2019). Thus, this research takes a pivotal next step to investigate the pathways by which sleep promotion learned at school is transferred home, and contributes to an emerging field of knowledge. Specifically, the objectives of this research were:

Objective 1: To examine children’s perceptions of their own sleep behaviour and determine if and how they translate school-based sleep promotion home.

Objective 2: To explore parent’s perspective on sleep behaviour and how parenting practices facilitate and support, or act as a barrier, to their children’s healthy sleep behaviours.

5.1.1 Objective 1 summary

The purpose of objective 1 was to examine children’s perceptions of their own sleep behaviour and determine if and how they translate school-based sleep promotion to the home. The research took place in APPLE Schools, a school-based health promotion initiative that utilizes the CSH approach and promotes sleep as a component of a healthy lifestyle. Using photovoice and interviews as a data generating strategy, students took photos of their home environment to explain their perceptions of sleep behaviour, and described school learnings and how these affected their sleep behaviours at home. Our results indicated four themes: (1) students conceptualized sleep as “healthy for your body and brain;” (2) student sleep habits were rooted in the home environment; (3) school

experiences shaped positive sleep habits in the home; and (4) students translated sleep behaviours home if they thought they were useful to their family.

The conceptualization that sleep was “healthy for your body and brain” emphasized a comprehensive understanding of sleep and that students felt sleep was important for the whole body. Students expressed that sleep was important to think clearly, process information, memory, focus, and attention. Students also indicated that sleep helped them feel less tired and moody. This was important because students indicated that if they were moody they could be rude to others, and this could have an effect on relationships with their peers. Students also voiced that sleep was healthy for their body, was important for their brain to develop, and for their body to grow. Students cited that sleep was important for their immune system, and to help heal their body from injuries. Overall, students demonstrated a thorough understanding of sleep, and the importance of getting a good night’s sleep on their both their body and brain.

Students sleep habits were rooted in the home environment. Students shared that they had sleep routines that were often directed by their parents. Students expressed having a bedtime routine since they were young, and their bedtime routine was often structured around their parent’s involvement. Students described that their parents sometimes set rules for them, and put them to bed, while other students believed that parents gave them more independence as they got older, and were able to perform their sleep routine alone. Importantly, the regulation of technology use varied. Students indicated that they understood the negative consequences of using electronics before bed, but would continue to use them if permitted by parents. Students cited boredom as the primary reason why they chose to engage with technology before bed.

School experiences shaped positive sleep habits in the home. Students perceived that their experiences at school helped them build on their understanding of the importance of healthy sleep practices at home. Students described aspects of their sleep routine that they already did, however, they felt that learning's from school helped them understand the importance of sleep practices. Underlying this theme was the concept that students embraced a healthy lifestyle to support their sleep. Students recalled learning to calm down before bed, being physically active, eating a healthy bedtime snack, avoiding caffeine and sugar before bed, and avoiding engaging in electronics. Overall, school experiences had an effect on student's understanding of sleep and shaped positive sleep habits in the home.

Lastly, students chose to share information about sleep that they learned at school if they thought it would be useful to the family. Students expressed that they shared information with their family if they wanted their family to be healthy and address their sibling's sleep. Students discussed that they tried to teach siblings that sleep is good for them. Students shared that they were aware of their siblings sleep habits and felt responsible for their siblings to get a good sleep. Alternatively, students chose not to share if they felt what they learned at school was not relevant to their family (e.g., their family already had healthy sleep habits), or if they felt their family would not listen or support them.

5.1.2 Objective 2 summary

The aim of objective 2 was to explore parent's perspective of sleep behaviours and how parenting practices facilitate and support, or act as a barrier, to their children's

healthy sleep behaviours. As parenting influences within the home affect child sleep behaviour (Meltzer & Montgomery-Downs, 2011), this objective complemented Objective 1 by providing parent insights into their influence on child sleep in the home. Additionally, parent receptivity towards school-based sleep promotion was explored, as parent involvement in school initiatives has promising results for children's health and academic achievement (Salinas & Epstein, 2004). Results were organized into three themes: (1) sleep is valued and supported (2) recognition of barriers to healthy sleep, and (3) schools are allies in promoting sleep.

Parents illustrated that they valued their child's sleep, and did their best to support it. Sleep was perceived to affect children's learning, attention, focus, and mood. A poor sleep meant that their child's grades might suffer, or children's mood would be impacted. Parents felt that if their child did not sleep enough, it would affect their ability cope with the demands of school and everyday life. Parents described that children who did get enough sleep were better equipped to focus and do schoolwork. Overall, parents viewed sleep as a significant factor that affected the health and well-being of their children.

Parents discussed practices that facilitated healthy sleep behaviours in children. Parents felt that setting and enforcing rules and establishing a consistent bedtime routine were important for developing healthy sleep practices. Parents voiced that they tried to establish rules with children when they were young, and wanted their children to have consistency in the routine so that they would know what to expect. They felt these factors would help children relax and prepare them to sleep.

Alternatively, parents recognized that barriers existed that prevented sleep in their children. Parents indicated that having a busy lifestyle made it difficult to get their

children to sleep on time. Parents also explained that on weekends their family activities and commitments often varied, and this would cause their children to go to bed later. Parents also felt that they were unable to prioritize their own sleep habits, and that they did not set a good example for their children. Parents shared that they were often busy themselves and did not have a good routine. In particular, parents cited having a TV in their bedroom as negative role modeling, and recalled that they did not follow the same rules around technology before bed that they enforced for their children.

Schools were conceptualized as allies in promoting sleep. Parents thought that sleep promotion in schools was valuable to reach children. Parents saw schools as venues where students could learn about healthy sleep habits, especially in cases where children would not otherwise learn about sleep. Parents discussed that the school and community could play a role in shaping student sleep behaviours, and viewed the classroom as a mechanism for change that would support children in learning about healthy sleep behaviours.

Parents believed that students who learned about sleep at school would bring this information home. Parents indicated that sleep promotion taught in schools would lead to conversations about sleep in the home. As well, parents recalled that their children helped them make positive changes around their own sleep behaviour, and felt that students could relay sleep information to the parent. Overall, parents were receptive to school-based sleep promotion efforts and believed in the utility of such interventions in making a positive impact in the home.

5.2 Interpretation of Findings

The findings from this thesis demonstrated that students and parents collectively perceived school-based sleep promotion as a viable strategy to support student sleep behaviours. School-based sleep promotion led students to reflect on healthy sleep practices, while parents identified school-based sleep promotion as a useful tool to increase student knowledge of sleep and improve student sleep habits. Parents believed that “schools were a partner in teaching healthy sleep habits” and felt that both the school and home needed to work together to promote healthy sleep behaviours in order to improve student sleep. It is well-established that the home and school affect child health behaviours (Epstein & Sanders, 2000; Faught et al., 2017) and that parent collaboration with school strengthens the likelihood of student success (Cox, 2005; Desforges & Abouchaar, 2003). Thus it is useful to involve the home in school-based sleep promotion, yet, current efforts have had minimal parent engagement (Epstein, 2018). Thus, this study provided novel understandings of both student and parent perceptions of school-based sleep promotion, and how school-based sleep promotion could translate home. Parents also believed that students were mechanisms of change and could share school learnings with their family, while students provided insight into their reasoning to share with their family. Findings from this research can be summarized into 3 general groupings: (1) conceptualizations of the importance of sleep, (2) sleep is mediated in the home, (3) school-based sleep promotion is a viable strategy to address child sleep. The following section will integrate findings from chapter 3 (objective 1) and chapter 4 (objective 2) of this thesis in order to compare student and parent conceptualizations of sleep and summarize the role of the home and school in mediating student sleep behaviours. This

section will also provide relevant research, policy, and practice recommendations for school-based sleep promotion within Canada.

Table 1

Comparison of student and parent themes: conceptualizations of the importance of sleep for children

Student themes	Parent themes
<p>Sleep is “healthy for your body and brain” and important for:</p> <ul style="list-style-type: none"> - Memory, focus, and attention. - Feeling prepared and able to participate in school - Have energy to play with friends - Mood, having a positive attitude, and being nice to friends - Physical growth and avoiding getting sick 	<p>Parents recognize that sleep is important for:</p> <ul style="list-style-type: none"> - Learning, attention, and focus in school - Functioning in school and everyday life - Brain development - Cranky, moody, quick to anger - Emotional management and coping, mental health

Students and parents recognized that adequate sleep in children was important for a wide range of health outcomes. Students and parents recognized that sleep had an effect on physical growth and brain development in children, and described that adequate sleep often related to how well a student could focus, pay attention, learn, and remember information in school. Indeed, sleep deprivation during critical developmental periods has

been associated with neuronal damage and reductions in neuronal plasticity (Jan et al., 2010) and negative implications towards brain health and cerebral blood supply (Dutil et al., 2018). These neurocognitive health outcomes of chronic sleep loss in school-aged children have not been thoroughly investigated in human populations, but give valuable insight into the consequences of sleep deprivation. Namely, neurocognitive health is linked to children’s attention, memory, and intelligence (Blunden et al., 2000) and leads to increases in hyperactivity, impulsivity, conduct problems (Fallone et al., 2012; Smedje et al., 2001) and has significant implications for school performance (Dewald et al., 2010; Taras & Potts-Datema, 2005). Both students and parents had knowledgeable understandings of sleep and perceived that inadequate sleep effected student learning outcomes.

Table 2

Comparison of student and parent themes: sleep is mediated in the home

Student themes	Parent themes
<p>Sleep habits are rooted in the home</p> <ul style="list-style-type: none"> - Sleep routine directed by parents - Parents are involved in differing ways in the bedtime routine (setting rules, making bedroom comfortable and safe, role modelling) - Technology use regulated in 	<p>Parenting practices that support healthy sleep behaviours</p> <ul style="list-style-type: none"> - Setting and enforcing rules - Establishing a consistent bedtime <p>Barriers to supporting healthy sleep behaviours</p> <ul style="list-style-type: none"> - Busy lifestyle (homework commitments, weekend

<p>the home (students use technology if permitted by parents, and use technology before bed if bored)</p>	<p>schedule, overscheduling)</p> <ul style="list-style-type: none"> - Parents not prioritizing their own sleep habits (using technology before bed, lack of sleep routine)
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Both students and parents highlighted the home environment as a mediator of sleep behaviours. Students and parents described that parents were involved in the sleep routine by setting and enforcing rules. Parent directed sleep hygiene practices such as setting and enforcing rules in the household around sleep has been found to promote child sleep; children who have rules around sleep have consistent sleep-wake routines, and adequate sleep duration (Buxton et al., 2015; Pyper et al., 2017). Students described their sleep routine as something they have always done and relied on parents to direct their sleep routine, while parents described that these practices were important to facilitate healthy sleep behaviours in the home. The home was a strong mediator of student sleep behaviours and indicated that parents mediate their children’s sleep routine throughout the school-aged years.

Technology use before bed was an issue that was jointly identified by parents and children as a barrier to promoting healthy sleep in the home. Students described that they understood the harmful effects on technology on their sleep but continued to use technology before bed if permitted by their parents. Parents identified their use of technology before bed as a barrier to promoting healthy sleep practices within the home and identified the potential negative implications on their child’s sleep behaviour. Indeed, parent screen time is a strong predictor of child and adolescent screen time (Lauricella et

al., 2015; Pieters et al., 2014) and suggests that parents use of technology before bed may influence their children’s screen use. Although parents in this study recognized that they set rules for their children before bed, they may not enforce these rules if they use technology themselves before bed. Setting and enforcing rules around technology is essential to fostering healthy sleep behaviours – children tend to use screens more often when they have fewer rules around electronics (Jago et al., 2012; He et al., 2010; Warren et al., 2002). Technology use before bed is an issue that prevents healthy sleep hygiene in the home and resonated with both parents and children.

Table 3

Comparison of student and parent themes: School-based sleep promotion is a viable strategy to address child sleep

Student themes	Parent themes
<p>School experiences shape positive sleep habits in the home</p> <ul style="list-style-type: none"> - Experiences at school help students reflect on their current practices and why they are important for their sleep. - Students embrace a healthy lifestyle (calming down before bed, being active, choosing a healthy bedtime snack) - Students translate sleep 	<p>Schools are allies in promoting sleep</p> <ul style="list-style-type: none"> - Sleep promotion is valuable to reach children and improve child sleep - Children can bring awareness of healthy sleep practices back to the home and engage the family to improve sleep behaviour. - For school-based sleep promotion to be successful

behaviours home if they think it's useful to the family (wanting their family to be healthy, addressing their sibling's sleep).	there must be collaboration between the school and home. Schools are a "partner in teaching healthy sleep habits".
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Students and parents perceived that school-based sleep promotion could result in changes within the home. Parents viewed school-based sleep promotion as a valuable tool to educate children on sleep and promote healthy sleep hygiene in the home. This notion was confirmed by students as they recalled that their school experiences helped them to reflect on the importance of practices that help them sleep. Students also conceptualized sleep as relating to a healthy lifestyle. It was promising that students identified HEAL behaviours as relating to their sleep health, as this was not previously observed in similar studies (Golem et al., 2019). Students participating in the present study attended APPLE schools, and thus it was likely that they learned from school to enact HEAL behaviours in the home and recognized that this was important for sleep as well. This finding is promising and reflects that APPLE Schools may help students to understand their health through a holistic lens.

Parents viewed students as change agents in the home and believed that students could bring awareness of healthy sleep practices home and engage the family to improve sleep behaviours. Students chose to share if they thought it was useful to the family, and that they wanted their family to be healthy. This finding is novel and suggested that parents viewed their children as a mechanism for change in the home. Previous evidence demonstrated that students initiated healthy lifestyle changes in the home environment

(Bresee et al., 2016; Gunawardena et al., 2016), however, this was yet to be demonstrated for school-based sleep promotion. Students described barriers to sharing with their family. For example, students described that they would not share information if they did not feel supported. In comparison to another study, trust was identified as a factor that influenced if children felt willing to share health information with their family members (Bresee et al., 2016). It was promising that parents in our study were likely to be receptive to their children's sharing of sleep information from school. Overall, this suggests that children are supported by their parents to translate sleep information to the home.

To effectively improve child sleep and academic outcomes, parents must be involved with school-based sleep promotion (Epstein, 2018). It was promising that parents felt that schools were “a partner in teaching healthy sleep habits.” Thus, parents were open to partnerships between the school and home. Taking a CSH approach to promote sleep is a viable option as it strengthens home, school, and community partnerships (“What is a ‘Comprehensive School Health Approach’?”, n.d). CSH asserts that students are the cornerstone of successful implementation and can initiate change in the home (McKernan et al., 2019; Storey et al., 2016). As it is substantiated that both the home and school environments affect child sleep behaviour, and that partnerships between the home and school result in improvements in child health and academic success, it is promising that parents expressed their willingness to be involved in school-based sleep promotion. Given the scarcity of evidence of school-based sleep promotion using a CSH approach, more research is warranted to effectively establish how school-based sleep promotion interventions are implemented beyond school walls.

5.3 Strengths and Limitations

This chapter provided a summary of two separate studies presented in this thesis, and combined perspectives of students and parents. In addition to the strengths and limitations provided in chapters 3 and 4, additional strengths and limitations are provided below. Student participants (Objective 1) were recruited from three APPLE Schools within Edmonton, AB, while parents (Objective 2) resided across Alberta. Therefore, parent perspectives include parents whose children do not attend APPLE Schools. Students were not necessarily the offspring of parents who participated in the study. As well, all parents who were interviewed identified as the child's mother and may not fully represent the perspectives of all caregivers within the home. In addition, the COVID-19 pandemic occurred during data generation with 8 of the parent participants, and may have influenced their sleep behaviour and interview responses. As well, the COVID-19 pandemic impacted families to varying degrees, and may have affected some parent's ability to participate in the study, thus affecting representation within the sample. This thesis demonstrated strength by utilizing photovoice as an effective data generation strategy to engage students. As well, the purposeful sampling of parents across Alberta and allowed for diversity across the sample (Sandelowski, 1995). Altogether, this thesis has gathered the collective insight of key stakeholders (students and parents) in order to inform a larger initiative aiming to improve school-based sleep promotion across Alberta. Thus, this research has extensive implications towards research, policy, and practice development within school-based sleep promotion initiatives across Canada.

5.4 Implications

This thesis provided novel insight into student's and parent's perspective of sleep. Altogether, the findings of this thesis can be used to inform future research, and contribute to practice and policy recommendations for school-based sleep promotion across Canada. Students demonstrated thorough knowledge of the importance of sleep, suggesting that school-based sleep promotion efforts can improve sleep knowledge. As well, future school-based sleep promotion interventions should include a strong focus on technology use in the home, and tailor implementation towards parents. Both students and parents cited technology as a barrier to healthy sleep in the home, and although students and parents understood that it was negatively affecting their sleep they still chose to use it unless they had rules enforced by their parents. Altogether, it is promising that school-based sleep promotion was well-received by both students and parents. Parents viewed school-based sleep promotion as a valuable tool to educate children on sleep and promote healthy sleep hygiene in the home, and this cognition was confirmed by students as they recalled that their school experiences helped them to reflect on the importance of healthy sleep practices. Future school-based sleep promotion interventions should include ways to address behavioural components of sleep, reduce technology use in the home, and engage parents throughout the process.

5.4.1 Recommendations for future research

This thesis addressed gaps in understandings of school-based sleep promotion. Firstly, the findings from this thesis bridged understandings between the home and school environment in supporting student sleep, and demonstrated the effect of parental

influence on student sleep behaviour. Thus, this thesis provides rationale for the use of the CSH framework to address child sleep as it fosters connection between the school and home in order to improve child health behaviours (“Comprehensive School Health Framework”, n.d). It is recommended that future school-based sleep promotion interventions incorporate the home into the intervention strategy. Additional research should explore the mechanisms by which parents decide to utilize the information that their children share about sleep, and how these sleep behavioural changes may be carried out and sustained within the home.

This thesis provided promising results regarding parental involvement in school-based sleep promotion. The results from this thesis demonstrated that parents were supportive of student’s school learnings about sleep, and felt that they would encourage their children to share with them and help them to implement healthier sleep practices in the home. These findings are encouraging as parent responsiveness to school-based sleep promotion has yet to be investigated, and parental involvement in school health initiatives has been historically difficult (Hornby & Lafaele, 2011; Hornby & Blackwell, 2018). Overall, the findings from this research suggest that parents are receptive to involvement in school-based health promotion initiatives and indicated that interactive homework assignments or games provided opportunities for family engagement. Overall, parents recognized that promoting child sleep is a collaborative effort between both parents and the school. As well, children can be leaders and foster communication between the home and school as a way to improve family health behaviours (Ferland et al., 2014). Additional research should investigate the role of leadership qualities in impacting

student sleep behaviour, as leadership and decisional ownership are associated with translating HEAL behaviours to the home (McKernan et al., 2019).

5.4.2 Recommendations for future policy and practice

A key finding of this thesis is that students had a comprehensive understanding of the importance of sleep, yet this understanding did not generate significant behavioural changes. This is most evident in our findings as students continued to use electronics even if they understood the negative impact of technology use on their sleep. Parents demonstrated similar conceptualizations of the importance of sleep, however, cited that their own behaviour was a barrier to promoting healthy sleep in the home. Altogether, these results warrant the need to implement a range of behavioural change strategies that address sleep health on various socio-ecological levels. Grounded in the CSH approach, the school is an organizational component that can address both individual and interpersonal factors by implementing school-based sleep promotion programs that promote sleep for the whole family. In addressing family sleep customs, parents may improve their sleep behaviour and promote healthy sleep habits for their children. However, different family systems may have unique sleep norms, customs, and practices that can vary drastically from one another, and programs must be sensitive to differing conceptualizations of sleep and culturally based practices. As well, the CSH approach underscores the importance of student involvement (Storey et al., 2016), and recognizes that students who champion health are instrumental in translating HEAL behaviours to the home (McKernan et al., 2019). Therefore, efforts to promote sleep in the home should

include intervention strategies that actively engage students and recognize their autonomy and decision-making capabilities.

The findings of this thesis can inform stakeholders (e.g., teachers, school administrators) in the development of school-based sleep promotion initiatives as the results of this thesis highlight both the success of such initiatives and the importance of home-school partnerships in promoting children's sleep. As sleep is currently integrated within the Alberta grade 4/5 health curriculum, this thesis aligns with provincial curricular outcomes and can support teachers in meeting sleep education learning outcomes. Within APPLE Schools, it is promising that students conceptualize sleep as related to their HEAL behaviours – this suggests that students are learning about HEAL and its relationship to sleep and this message aligns with national sleep recommendations such as the 24-Hour Movement Guidelines. Altogether, this thesis demonstrated that the CSH framework is a viable approach to facilitate the translation of school learned sleep promotion to the home. Through the CSH approach additional resources can be utilized by families and partnering organizations to ensure that Canadian children meet the 24-Hour Movement Guidelines. As well, the findings of this study can inform public health interventions strategies and gives rationale towards the importance of partnerships between schools and the home. As this project fits within a wider initiative aiming to shape and improve school-based sleep promotion within Canada, it has direct Knowledge Translation and Exchange (KTE) opportunities. As an overarching objective, the results of this research will be integrated into relevant KT product tools such as the Public Health Agency of Canada's KT Primer and Dissemination Planning Tool and KT Planning Templates. These tools will then be utilized to combine researchers,

practitioners, and policymakers perspectives to identify key research findings that can be effectively disseminated to relevant practice communities. As core KT messages are identified, products will be developed for children and parents in order to promote sleep health. As well, the findings of this research will be published within peer-reviewed journal articles and have been presented at three academic conferences throughout the Fall of 2019 and Spring of 2020.

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APPENDIX A: Objective 1: School Information Letter

Title of Study: Sleeping soundly: Understanding the translation of sleep promotion at school to sleep behaviours at home. Insights from children and parents

Principal Investigator: Dr. Kate Storey, PhD. RD, kate.storey@ualberta.ca; 780-492-9609

Overview:

Sleep is increasingly recognized as a behaviour that plays a vital role in achieving a healthy lifestyle, and is also crucial to children's development. Research has shown that inadequate sleep is associated with an array of physical and psychosocial health deficits. Further, shorter sleep duration and poorer sleep quality are linked to poorer academic outcomes. The home and school are recognized as critical environments to shape healthy behaviours, and as such, health promotion efforts have increasingly focused on the school setting. While several school-based education initiatives have been implemented to support improved sleep among children, it is unknown if sleep behaviours are being translated home. The overall aim of this proposed research is to understand how school-based sleep education translates to sleep behaviours at home. Children are often viewed as change agents for health behaviours, thus this research will examine if and how children act as change agents and initiate sleep behaviour changes in the home.

Schools/Students Involved:

Total Number of Schools: 5 APPLE Schools that implement 'Be a Sleep Star'

Classrooms Involved: Grade 5 classrooms

Timelines: by end of 2017/2018 school year

Process:

The first phase of this project will be explored using a method called Photovoice. Photovoice will involve students taking pictures which demonstrate how school-learned sleep promotion translates home, and using these photos to supplement a subsequent one-on-one interview. After parent and student consent forms have been completed, the project will require a Research Coordinator's involvement and facilitation in the classroom over three separate sessions:

1. **All Students:** The first stage of the project will consist of a Research Coordinator (from Dr. Storey's research group) introducing the research project to the class, and explaining how they can be a part of it. During this initial meeting, students will have an opportunity to brainstorm and share their experiences of being part of an APPLE School in order to orient them to the research. Each student will receive a disposable camera and written photo-taking instructions and etiquette. These instructions will also be reiterated orally (**Class time required: approximately 30 minutes**).
 - It is to be expected that not all students will return their parent consent forms. In order to ensure **all students are included in stages 1 and 3 of this project**, cameras will be given to all students. However, only the students with signed and completed consent forms will partake in the second stage (individual interviews).
 - The students will have one week to take their photos. Upon completion of photo-taking, the students will be asked to return their cameras to their teacher (you). The Research Coordinator will collect the cameras one week after our initial class meeting.
 - Each student will receive a copy of their photos to keep.

2. **Only Students with Consent:** The second stage involves individual one-on-one interviews with students who returned their signed consent forms. These interviews will take **approximately 20-30 minutes each** and will be conducted individually at school, during class time (pulled out individually), at lunch or recess break, or before or after school. Interviews will take place in the school in a quiet classroom or office, and will be audio recorded. Students will be reminded that their participation is completely voluntary, and that they may withdraw their involvement at any point in time.
3. **All Students:** The third stage of this project involves a classroom discussion in order to get feedback on the students' participation in the photo-taking activity. This collective discussion may bring forward new ideas and plans for action, and aligns well with inquiry-based learning. Students will have an opportunity to discuss and provide their opinions once more as to whether or not the findings from the individual interviews truly resonate with their collective thoughts, values and opinions as well as others within the class. This meeting will also be an opportunity to brainstorm a creative way that the students wish to share the results of this photovoice activity with their school community (i.e., a poster or PowerPoint presentation). The aim of this stage will be to celebrate the students' involvement in the project, and share their results with their school community (**Class time require: approximately 30 minutes**).

Next Steps and Further Information

Dr. Storey will be in touch with you (over the phone) to discuss this project in more detail.

If you have any further questions regarding this study, please do not hesitate to contact:

Dr. Kate Storey, PhD, RD: kate.storey@ualberta.ca, (780) 492-9609

The plan for this study has been reviewed by a Research Ethics Board at the University of Alberta. If you have questions about your rights or how research should be conducted, you can call (780) 492-2615. This office is independent of the researchers.

APPENDIX B: Objective 1: Parent Information Letter and Consent Form

To the Parents or Guardians of Grade 5 Students

Title of Study: Sleeping soundly: Understanding the translation of sleep promotion at school to sleep behaviours at home, Using Photographs to Explore the Reach of APPLE Schools

Principal Investigator: Dr. Kate Storey, PhD, RD, 780-492-9609

Background

Your child is invited to participate in a research project involving photo-taking and one-on-one interviews. Your child has been chosen to participate because he or she is a student at an APPLE School.

Purpose

Students have an important role in APPLE Schools, and we would like to gain a better understanding of their views. The home environment is shown to play a large role in health outcomes. **The purpose of this study is to increase our knowledge of student perceptions of how sleep promotion through APPLE Schools translates to sleep behaviours in the home environment.** These findings are important because they can inform us of the effectiveness of APPLE Schools.

Study Procedures

Participation in this research involves three steps:

1. First, the whole class will meet with the researcher and get verbal instructions about the project. The students' role and the project goals will be explained. **Each child will receive a camera** and written instructions about its proper use. Your child will be asked to take photos of what the APPLE School's campaign 'Be a Sleep Star' looks like in their home environment. Children may take as many photos as they wish but they will be asked to not include photos of themselves or other people. Students will have one week to take their photos, then the cameras will be collected by the researcher and photos will be developed. Students will get a copy of their own photographs to keep.
2. The second part of this project involves a one-on-one interview with your child at the school. The photos that your child has taken will be used in the interview as topics for discussion. Your child will be asked to describe the photos they have taken and how these photos relate to APPLE Schools. The interview will take 20-30 minutes. Students may be asked to complete interviews during lunchtime or recess break, or during class time (with teacher permission).
3. Lastly, a meeting will be held with the whole class to talk about the interview findings as a class. This final meeting will ensure that the research results are true to the students' beliefs. The classroom/school will receive a photobook that does not identify individual participants.

Benefits

Sharing the ideas your child has will give us a better understanding of their experiences in an APPLE School. The information they provide will help guide future project success and improve the services provided. The information we gather will also be useful to understand the project's impact beyond the school environment. All students will receive a copy of their own photographs to keep and will have the opportunity to have a photo included in the classroom/school photobook. The teacher has confirmed that the activity is within existing curriculum.

Risks

There are no known risks associated with participating in this study. If any of the questions asked in the interview make your child feel uncomfortable, they can choose not to answer them. You or your child may ask for a copy of their photographs at any time. Any information you wish not to be included will be removed. We will work closely with the classroom teacher to promote a respectful classroom environment for sharing during the whole class talk. This meeting will be prefaced with a statement outlining an expectation of respectful listening and discussion among students.

Voluntary Participation

Taking part in this project is completely voluntary. There will be no negative effects if your child does not want to participate. Students who do not participate in this research will still be given a camera to take photos, however these photos and views will not be included in any official research findings. Once parental consent is given, verbal student assent will also be given before students can participate. Interviews will be audio recorded and your child will have a clear understanding that they can request to shut off the audio recording and end the interview at any point in time. Your child's information can be removed from the study within one month of data generation if you and/or your child decide later that they do not want to participate. If you or your child wishes to withdraw or have any other questions, you may contact Dr. Kate Storey at the email address or phone number listed below.

Confidentiality & Anonymity

Your child's privacy will be maintained. To protect your child's identity, the photos will not be linked with any names. Any publication of photographs for research or in the photobook will not be linked with names. Your child will be given a false name for interview transcription and publishing purposes. We want to emphasize that any information provided throughout the interview will be kept confidential and will not be shared with any other individual. We will not record any personal information in the written records and to protect against personal information being released, we will ensure that your child's participation in this study, and any information that they provide, remains confidential. All information will be stored in a locked file cabinet in a locked office at the University of Alberta. Electronic copies of transcripts will be stored on a password protected secure server. Only members of the research team will have access to this information. The photographs, audio recordings, transcripts, and master lists are kept for five years after the data are published, after which they will be destroyed.

Further Information

If you have any further questions regarding this study, please do not hesitate to contact:
Dr. Kate Storey, PhD, RD: kate.storey@ualberta.ca, (780) 492-9609

The plan for this study has been reviewed by a Research Ethics Board at the University of Alberta. If you have questions about your rights or how research should be conducted, you can call (780) 492-2615. This office is independent of the researchers.

Consent Statement

I have read this form where the research study has been explained to me. I have been given the opportunity to ask questions (contact Kate Storey above) and if I had questions, my questions have been answered. If I have additional questions, I have been told whom to contact. I agree to allow my child to participate in the research study described above.

Signature of Student's Parent of Legal Guardian

Date

Printed Name

Interest in Future Research

We are interested in understanding parents' perspectives regarding the importance of sleep behaviours, and ways they may support sleep behaviour in their children. If you are interested in participating in a qualitative interview (45-60 minutes either in person or over the phone) to provide your perspective, please complete the following section. We will contact you with additional information regarding this research. If you chose to participate, a modest honorarium (\$50 gift card) will be provided to thank you for your time.

Email Address: _____

Phone Number: _____

APPENDIX C: Objective 1: Student Assent Form

Title of Study: Sleeping soundly: Understanding the translation of sleep promotion at school to sleep behaviours at home, Using Photographs to Explore the Reach of APPLE Schools

Principal Investigator: Dr. Kate Storey

Phone Number: 780-492-9609

We want to tell you about a research study we are doing. A research study is a way to learn more about something. We would like to find out more about what you think about 'Be a Sleep Star' in your school and home. You are being asked to join the study because you are a grade 5 student at an APPLE school.

If you agree to join this study, you will be asked to take 20 photographs of healthy and unhealthy things in your school and at home. I will give you your own camera to use. After you take your pictures, you will meet with me to show and tell me about your favourite photos. We will talk about your pictures for 20-30 minutes.

You should not feel uncomfortable when you participate in this study. If you ever feel unhappy or do not want to answer any of my questions, we will stop the meeting.

This study will help us learn more about your sleep at home. We may also learn something that will help other children to be healthier at school and at home.

You do not have to join this study. It is up to you. You can say yes now and change your mind later. All you have to do is tell us you want to stop. No one will be mad at you if you don't want to be in the study or if you join the study and change your mind later. You have until one month after you join the study to stop being a part of it (contact Kate Storey below).

Before you say **yes or no** to being in this study, we will answer any questions you have. If you join the study, you can ask questions at any time. Just tell the researcher that you have a question.

If you have any questions about this study please feel free to contact Kate Storey at 780-492-9609 or kate.storey@ualberta.ca

Yes, I will be in this research study. No, I don't want to do this.

Child's name

Date

Person obtaining Assent

Signature

Date

APPENDIX D: Objective 1: Brainstorming Session Outline

*Sleeping soundly: Understanding the translation of sleep promotion at school to sleep behaviours at home.
Insights from children and parents*

Photovoice Brainstorming Session

Brainstorming Session to Orient Students to the Research

1. Introductions
 - From the University of Alberta and doing a research project
 - *“Before we get to the cameras, I need your help with some brainstorming...”*
2. We want to learn more about ‘Be a Sleep Star’
 - *“Do you know that you are part of an APPLE School that promotes ‘Be a Sleep Star’?”*
 - Share your experiences/past activities
 - What makes ‘Be a Sleep Star’ special/different?
 - Reference School Health Facilitator
3. Individual brainstorming (3 minutes)
 - Everyone gets a piece of paper
 - Brainstorm what ‘Be a Sleep Star’ looks like (at school)
4. Introduce the word web
 - Example re: winter
 - Activities: sledding, skating, making snowman
 - Clothes: mittens, coat, snow pants, toque
 - Weather: cold, snow, windy, icy
 - Groups of 4-5; one paper and marker
 - 5 minutes to make a word web of **“What does ‘Be a Sleep Star’ look like at (school name)?”**
5. Go around to groups and listen to conversation and suggestions
6. Group Discussion: Popcorn sharing
 - Groups share their responses
 - Write on the white board/paper
7. Introduce research
 - *“We just talked about what ‘Be a Sleep Star’ looks like at (school name). Now I need your help to learn what ‘Be a Sleep Star’ looks like at home.”*
 - Each student will get 1 camera to take home and take pictures of what ‘Be a Sleep Star’ looks like in their home
 - **Brainstorm 3 things that we can take pictures of at home (Note: indicate that students should take pictures that include more than just their bed)**
8. Hand out photo-taking instructions
 - Go through as a class
9. Camera DEMO
 - Hold flash button until light shines
 - Wind the dial until number goes down
 - Look through the window
 - Press button at the top of the camera (demo)
10. Give out consent forms
11. Give students a camera. Practice holding down the flash but DON’T wind the dial!
12. Everyone writes their names on their cameras

APPENDIX E: Objective 1: Photovoice Interview Guide

Sleeping soundly: Understanding the translation of sleep promotion at school to sleep behaviours at home. Insights from children and parents

Photovoice Interview Guide

Child Name	
School Name	
Grade Level	
Male/Female	
Age	
How long have you been at this school?	
Home Demographics	
Who lives there (# and type)	
Type of dwelling	
Sleeping Environment (Where does child sleep, how many people sleep bedroom/bed, set bedtime, enforcer of bedtime)	

1. SELECTING:
 - a. Ask: **“Select 5 or 6 photos which best represent what ‘Be a Sleep Star’ looks like in your home.”**
 - *Interviewer: please label these photos 1-6 with post-it notes accordingly, in order to correctly reference photos during data analysis*

2. CONTEXTUALIZING/STORY-TELLING:

Students explain each of the photos and are encouraged to tell a story to describe the situation and why they took the pictures.

 - a. Guiding questions (for each photo) – as aligned with SHOWeD:
 - Why did you take this photo?
 - What do you *see* here?
 - What’s *happening* in your home?
 - How does this relate to *our* lives (at home/at school)?
 - How does this relate to ‘Be a Sleep Star’ and what we talked about as a class?
 - *Why* do you have/do this in your home?
 - Has something you learned in school influenced you to *do* this?

3. CODIFYING/THEMING
 - a. Group ideas together with the help of the student, if possible.
 - Are any of these pictures similar? How so?
 - b. Have students give their selected photos a name or title.

4. General Discussion Questions:
 - Does this picture remind you of something you have done at school?
 - How is your home like ‘Be a Sleep Star’? How is it different?
 - How could we make your home supportive of ‘Be a Sleep Star’?
 - What kinds of things do you learn at school and share with your family at home?
 - What’s an important thing you have learned through ‘Be a Sleep Star’ that you remember to do at home?

GENERAL TIPS FOR HAVING HEALTHY SLEEP HYGIENE¹⁴² (Chaput, 2016)

	Go to bed and wake up at the same time every day (even on the weekends!)		Don't go to bed feeling hungry , but also don't eat a heavy meal right before bed
	Avoid caffeine consumption (e.g., coffee, soft drinks, chocolate) starting in the late afternoon		Develop a relaxing routine before bedtime – ideas include bathing, music, and reading
	Expose yourself to bright light in the morning – sunlight helps the biological clock to reset itself each day		Reserve your bedroom for sleeping only – keep cell phones, computers, televisions and video games out of your bedroom
	Make sure your bedroom is conducive to sleep – it should be dark, quiet, comfortable, and cool		Exercise regularly during the day
	Sleep on a comfortable mattress and pillow		Don't have pets in your bedroom

APPENDIX F: Objective 2: Parent Information Letter and Consent Form

To the Parents or Guardians of School-age Children

Title of Study: Sleeping soundly: Understanding the translation of sleep promotion at school to sleep behaviours at home

Principal Investigator: Dr. Kate Storey, PhD, RD, 780-492-9609

Purpose

You are being asked to participate in a semi-structured interview in order to increase our understanding of parents' perspectives regarding the importance of sleep behaviours, and ways parents may support sleep behaviour in their children.

Participation involves a one-on-one semi-structured interview, lasting approximately 30 minutes. Interviews will be scheduled at a time convenient for parents, and will take place either in person or over the phone. During the interview you will be asked a series of questions about your perspectives regarding sleep. You will be asked to describe your views on the importance of sleep behaviours, and ways you may or may not support sleep behaviour. Interviews will be recorded to ensure that the discussion is captured accurately and will be transcribed immediately following the interview. You will receive a cash reimbursement for parking at the rate of \$15.00 per visit for up to 2 visits for a total value of \$30.00. You will also receive cash reimbursement for public transportation costs by reimbursement of \$3.50 per visit for up to 2 visits for a total value of \$7.00. As well, you will receive a gift voucher (type determined by your location within Alberta) in the amount of \$25.00 after completion of the interview to thank you for your time and contribution to the research study.

Benefits

Sharing the ideas you have will give us a better understanding of your perspectives regarding children's sleep. The information you provide will help guide future project success and improve the services provided. The information we gather will also be useful to understand the project's impact beyond the school environment.

Risks

There are no known risks associated with participating in this study. If any of the questions asked in the interview make you feel uncomfortable, you can choose not to answer them. Any information you wish not to be included will be removed.

Voluntary Participation

Taking part in this project is completely voluntary. There will be no negative effects if you do not want to participate. Interviews will be audio recorded and you can request to shut off the audio recording and end the interview at any point in time. Your information can be removed from the study within one month of data generation if you decide later that you do not want to participate. If you wish to withdraw or have any other questions, you may contact Dr. Kate Storey at the email address or phone number listed below.

Confidentiality & Anonymity

Your privacy will be maintained. To protect your identity, you will be given a false name for interview transcription and publishing purposes. We want to emphasize that any information provided throughout the interview will be kept confidential and will not be shared with any other individual. We will not record any personal information in the written records and to protect against personal information being released, we will ensure that your participation in this study, and any information you provide, remains confidential. All

information will be stored in a locked file cabinet in a locked office at the University of Alberta. Electronic copies of transcripts will be stored on a password protected secure server. Only members of the research team will have access to this information. The audio recordings, transcripts, and master lists are kept for five years after the data are published, after which they will be destroyed.

Further Information

If you have any further questions regarding this study, please do not hesitate to contact: Dr. Kate Storey, PhD, RD: kate.storey@ualberta.ca, (780) 492-9609

The plan for this study has been reviewed by a Research Ethics Board at the University of Alberta. If you have questions about your rights or how research should be conducted, you can call (780) 492- 2615. This office is independent of the researchers.

Consent Statement

I have read this form and the research study has been explained to me. I have been given the opportunity to ask questions and my questions have been answered. If I have additional questions, I have been told whom to contact. I agree to participate in the research study described above and will receive a copy of this consent form. I will receive a copy of this consent form after I sign it.

Signature of Participant

Date

Printed Name

APPENDIX G: Objective 2: Parent Interview Guide

Parent/Caregiver Interview Guide

Name	
Gender	
Age	
Child(ren) Name(s)	
Child(ren) Age(s)	
Grade Level of Child(ren)	
School Name	
How long has your child been attending their current school?	
Home Demographics	
Who lives there (# and type)	
Type of dwelling	
Sleeping Environment (Where do child(ren) sleep, how many people sleep in each bedroom/bed)	

Parenting:

1. How would you describe your overall approach to parenting?
2. Do you parent differently in different situations? (i.e., do you have different expectations for your child [or child in your care] in school versus at home?)
3. Some people say their approach to parenting changes over the years. Has your approach changed over the years? How and why do you think it is or has changed?
4. If applicable, do you parent different children in different ways? If applicable, how and why are there differences?

Sleep:

5. Can you please describe the sleeping environment at home?
 - a. Where do child(ren) sleep, where do adults sleep? How many people in each bed? Pets in room?
 - b. What is room like (technology, quiet, dark, cool – probe for other sleep hygiene)
6. Do you feel that sleep is important for your child [or child in your care]? Why or why not?
 - a. Probes: affects other areas of children’s physical and mental development, behaviour problems, academic achievement
7. Would you describe your child [or child in your care] as a good sleeper? Why or why not?
 - a. Probes: seems tired, takes naps, difficulty waking up, complains about problems sleeping
8. Are you concerned about your child(ren)s [or child(ren) in your care] sleep? Why or why not? If so, what concerns you?

- a. Probes: struggles at bedtime (e.g., cries, refuses to stay in bed), sleep quality, sleep duration (e.g., too much/little/right amount/night waking), nightmares/fears, seems tired, medical concerns (e.g., snore, coughing, heavy/loud breathing, wet the bed, restless, sweating, grind teeth), behavioural concerns, etc.
9. Do you ever seek out information to support sleep behaviours in your home environment?
 - a. Probes: If so, where and who do you get this information from?
 10. Do you feel you could change your child(ren)'s [or child(ren) in your care] sleep behaviours? Why or why not?
 11. If you wanted to change your child(ren)'s [or child(ren) in your care] sleep behaviours, what do you feel the best way to do this would be?
 12. Have you ever tried to change your child(ren)'s [or child(ren) in your care] sleep behaviours? Why or why not? If so, how did you do this?
 13. Can you please describe any specific bedtime routines in your home?
 - a. Probes: specific time for bedtime [weekends/weekdays], activities before bedtime (*relaxing* [bath, books], *exciting/stimulating* [rough play, video games, sports, technology], *other screen time* [TV, videos, DVDs, tablet, smartphone]), etc.
 14. Can you please explain any rules around your child(ren)'s sleep behaviours? If so, what your rules?
 - a. Probes: set/enforce regular bedtime/waketime, monitor screen time before bedtime
 15. In what ways does your sleep routine differ from that of your child(ren) [or child(ren) in your care]?
 - a. Probes: Do you role model healthy sleep behaviour to your child(ren) [or child(ren) in your care]? If so, please give an example.
 16. Do you believe that other health behaviours affect sleep? Why or why not?
 - a. Probes: sleep hygiene tips such physical activity, going to bed full, avoid caffeine consumption, bedtime routine, no electronics in the bedroom, consistent sleep/waking times on weekdays and weekends.

School-based Sleep Education:

15. What kinds of things does/do your child(ren) [or child(ren) in your care] learn at school and share with your family at home?
 - a. Probes: Has this impacted any changes in your home environment (physical, social)?
16. Has/have your child(ren) [or child(ren) in your care] ever shared information about any campaigns at school to promote healthy sleep (e.g., 'Be a Sleep Star', 'Dream Team', 'Sit, Step, Sweat, Sleep Repeat') with you?
 - a. Probes: If so, did it impact any changes in your home?

17. What role do you think your child's [or child in your care] school has in teaching healthy sleep behaviours?
18. Do you feel schools have a responsibility to teach children about healthy sleep habits?
 - a. Probes: Why or why not?
 - b. Probes: Is this the responsibility of the school or the parents? Or a collaborative effort?
19. In what ways do you think sleep education that is learned at school could be used by the whole family?
 - a. What are some ways that this process can be improved?
20. Are you aware that your child [or child(ren) in your care] attends an APPLE School? Can you tell me about some of the initiatives that have occurred as a result of being in an APPLE School?
 - a. Probes: Nutrition, physical activity, mental wellbeing, sleep

Closing Questions:

21. What would an ideal bedtime routine/sleep routine look like for you and your child [or child(ren) in your care]?
22. What do you think is the biggest barrier to a good night's sleep?

Those are all the questions I have for you today. Is there anything else you would like to add?