



## Original Article

## School-based sleep health education in Canada

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## ABSTRACT

**Background & Objective:** Canadian Ministries of Health and Education across all provinces aim to support and maximize the mental and physical health of students to ensure their ability to fulfill their academic potential. Chronic sleep loss affects all of these domains. However, tools to optimize youth sleep are generally lacking.

**Methods:** This manuscript explains the rationale for the integration of sleep health education into schools, describes the barriers to sleep health education, outlines efforts made to address them in Canada, and discusses future directions for sleep health education in Canada.

**Results:** There is unequivocal evidence that sleep plays critical roles in achieving the key goals to which Canadian schools are committed. Sleep restriction and poor sleep habits resulting from hectic, demanding, unbalanced lifestyles; pressure for academic success; participation in extracurricular activities; and the low priority given to sleep over competing activities are prevalent in Canadian youth of all ages and may significantly impair their learning, well-being, and health. Attempts to integrate sleep health education into school curricula meet with multiple barriers. Some of these barriers can be overcome by using community-based participation to develop and implement school-based sleep health education programs.

**Conclusion:** Successful school-based sleep health promotion programs hold the promise of having a long-lasting positive impact on students' physical and mental health, academic performance and daytime functioning.

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## 1. Background

Canadian Ministries of Health and Education across all Canadian provinces aim to support and maximize the mental and physical health of Canadian students to ensure their ability to fulfill their academic potential. Mounting evidence indicates that adequate sleep has beneficial effects on health, learning, memory, attention, emotional regulation, and academic success. Conversely, fatigue and insufficient/inadequate sleep can negatively affect health, academic performance, self-regulation, and attention, all of which are necessary for success in school. Chronic sleep loss, which has been called one of the common plagues of modern society [1], affects a large proportion of youth across the world, including in Canada

[2,3]. Studies conducted in Canada have shown that children of all ages do not get adequate sleep. Given the negative impact of inadequate sleep on academic performance [4–6], mental health, and physical health [7], it seems that sleep optimization should be prioritized by education ministries and school boards as a means to improve the academic performance, mental health, and physical health of students. Such intervention is expected to have an important positive impact because it would offer an accessible, inexpensive, non-pharmacological means for promoting the mental and physical health as well as learning capacity of Canadian youth.

Despite the pervasiveness and magnitude of sleep deprivation and poor sleep habits in Canadian youth and the consistency between the missions of the Canadian Ministries of Education and the benefits of healthy sleep, appreciation of the importance of sleep and the prioritization of sleep health as a part of school health curricula vary across the Canadian provinces. Furthermore, the tools to support the behavioral changes needed to optimize sleep

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are generally lacking. This is a problem because in the absence of such tools, many individuals may fail to fulfill their academic potential and to maintain their emotional and physical health. The *objectives of this manuscript* are: 1) to explain the rationale for integrating sleep education within Canadian schools; 2) to describe the barriers to sleep health education and the efforts made to address them in the province of Quebec in Canada; and 3) to identify and discuss future directions in sleep health education in Canada.

## 2. The rationale for integrating sleep education within Canadian schools

Since 1905, thousands of studies have examined the associations between sleep and an array of key cognitive, emotional, and physical processes that are essential for the optimal academic performance [5,8,9], mental health [10], and physical health of youth [7,11]. These studies have provided scientific evidence showing that sleep plays critical roles in the optimal execution of learning, memory, executive functions, sustained attention, emotional regulation, and mood regulation [12–17], all of which are essential for academic success, adjustment, and mental health. This is because neural areas that govern emotional regulation and executive functions are sensitive to sleep deficiency [18–25]. The connection between sleep and academic performance also manifests itself with regards to report card grades. For example, a comparison between school performance measures and reported total sleep time found that students who had grades of C, D, or F averaged 25–30 min less sleep per weeknight than did their peers with better grades [26]. In addition, sleep efficiency has been found to be associated with report card grades in Math, English, and French among Canadian students [27]. In terms of physical health, sleep is essential for restoring the body at the cellular level, and sleep optimization leads to improvements in metabolism, appetite regulation, and functions of the cardiovascular system, endothelial cells, and the immune system. Sleep deficiency is associated with increases in blood pressure and the incidence, progression, and severity of cardiovascular disease, diabetes, obesity, cancer, metabolic syndrome, and neuroendocrine abnormalities. Collectively, these studies provide unequivocal evidence that sleep plays critical roles in achieving the key goals to which Canadian schools are committed: maximizing the academic success, mental health, and physical health of their students.

Sleep restriction and poor sleep habits resulting from unbalanced lifestyles, are prevalent in Canadian youth of all ages and may significantly impair their learning, well-being, and health.

Healthy sleep must be adequate and consistent in its duration, quality, and timing. Several recent large-scale studies examining the sleep duration of Canadian youth found that only 51%–69% of students had sleep that fell within the recommended durations, that 60% reported feeling tired in the morning [28], and that detrimental sleep characteristics (eg, insufficient duration, low efficiency, and inconsistent schedules) are correlated with lifestyle behaviors of Canadian youth. For example, poor sleep in Canadian youth was found to be associated with more sedentary behavior, more screen time, poor eating habits, and low prioritization of sleep over competing activities [29,30]. The existing reports suggest that one third to one half of Canadian youth does not get the recommended amount or quality of sleep, and that this population engages in behavior that hinders the healthy sleep that is needed for optimal academic performance and good physical, emotional, and mental health.

Experimental sleep studies indicate that it is possible to increase sleep duration and improve sleep habits, and that sleep extension leads to improvement in daytime functioning [31–34]. In typically

developing school-age children, sleep extension has been associated with improvements in performance on tasks measuring reaction-time, executive functions, memory and sustained attention and with detectable improvement in Conners' Global Index–derived emotional lability and restless-impulsive behavior scores of children in school [35]. In typically developing adolescents, a moderate sleep extension was associated with improvements in sleepiness, anger, vigor, fatigue, confusion, cognitive tempo, and driving ability [31]. These findings are important because they suggest that moderate changes in sleep duration can have detectable effects on the academic success and behavior of youth. Hence, extending and improving sleep could be an effective means to maximize the ability of our youth to fulfill their academic potential while also improving their emotional health.

In “real life”, sleep can be extended by waking up later than usual, going to bed earlier than usual, or a combination of the two. For adolescents, the weekday wake-up time is determined by the school-start time. There has been much discussion regarding the identification and implementation of school-start times that will allow youth to obtain sufficient sleep. A statement issued by the American Academy of Pediatrics urged middle and high schools to aim for school start times of 8:30 a.m. or later, as it is thought that this will allow students to receive 8.5–9.5 hours of sleep per night [36]. Gariepy et al. examined school start time in Canadian schools, as reported by 29,635 students aged 10–18 years. They found that the mean school start time was 8:43 a.m. (SD: 0:17) and ranged from 7:57 to 9:37 a.m [28]. Combining this with other findings, we see that although most Canadian high schools start around the recommended start time (8:30 a.m.), a large number of Canadian students still do not get enough sleep. This suggests that although further delaying the school-start time could help address the epidemic of sleep deprivation and/or poor sleep hygiene amongst Canadian youth, it might not fully resolve these issues. Healthy sleep requires sleep of adequate and consistent duration, quality, and timing, and a delayed school-start time will not ensure all of these aspects. Instead, the evidence suggests that we must seek to empower students to adopt healthy lifestyles in which their daily choices allow for sleep of consistent duration, quality, and timing.

The integration of sleep health education programs into school curricula has been proposed as a way to improve youth sleep health. Among young people, such programs are expected to increase knowledge regarding the importance of sleep and to significantly improve sleep behavior, habits, and related outcomes, including mental health and academic performance. Schools have been identified as an ideal formalized setting for health promotion programs because they can reach large segments of the youth population, provide a platform for health education and promotion [37], and actively encourage children to adopt and maintain a healthy lifestyle. In addition, it has been shown that using the existing infrastructure of the educational system can be a cost-effective route for delivering health promotion programs. Studies in other areas, such as obesity prevention and healthy eating, have shown that if school administrators and teachers are open to integrating school-based health promotion programs into existing school curricula, then the use of such curricula has the potential to become an acceptable and feasible method for reaching youth. However, despite the convincing rationale for using schools as a base for creating sleep health promotion programs for adolescents, most of the findings in this area have failed to reflect benefits in the real world. The published studies examining sleep education programs throughout the world have yielded mixed findings regarding the impact of these programs on adolescents' sleep behavior, knowledge, and daytime outcomes [38–53]. For example, the work of Blunden (2012) showed very clearly that the adolescents' sleep knowledge had increased following their school-based sleep

education program, but found no change in their sleep behavior or daytime outcomes [54]. Sheldon (2015) was similarly frustrated in his attempts to identify mechanisms to improve the impact of a school-based sleep education program on students' sleep and academic success [55]. The following sections of this manuscript describe our experiences with integrating school based sleep health education into Canadian schools in Quebec.

### 3. The Canadian educational landscape

Canada is made up of 10 provinces and three territories herein collectively referred to as provinces, each of which is very distinct in its culture, lifestyle, and economy. Education is the responsibility of the individual provinces, and provincial departments of education determine the education policy in accordance with provincial laws. Each province is divided at the local level into school districts that are governed by a superintendent and a locally elected school board (or board of education), which decides on instructional policies, hires teachers, purchases equipment, and generally oversees the day-to-day running of schools. Thus, the practices and policies regarding education (public and private) vary considerably from province to province and from district to district. Most schools have Parent Advisory Councils that contribute to multiple decisions made by the school, including participation in research projects. The provincial Minister of Education is responsible for setting policy relating to educational affairs; however, the Canadian public school system is decentralized, and the schools are largely run by local school authorities. This educational landscape means that unless there is a province-level mandatory requirement, individual schools or school boards are de facto responsible for determining whether to integrate a certain program into their schools. In the context of integrating school-based sleep health education into schools, a program must be endorsed at the school and school board levels and there must be interest and acceptance by all relevant stakeholders, including school board administrators, school principals, educators, mental health staff, parents, and students. For a policy to be made compulsory for all schools in a province, such a decision must be made and enforced by the provincial Minister of Education. In the absence of a compulsory policy, the integration of any curriculum is undertaken at the discretion of individual schools, school boards, Parent Advisory Councils, and educators.

### 4. Integrating sleep health education within our school boards

Our partnership has significant experience in integrating sleep health education within our school boards. This Quebec-based partnership includes the Riverside School Board (RSB), the Lester B Pearson School Board (LBPSB), and the Attention, Behaviour, and Sleep (ABS) Lab at McGill University/Douglas Research Center in Montreal. RSB is an English-language school board whose territory spans more than 7,500 square kilometers and extends from Sorel in the north, along the St. Lawrence River to Sainte-Catherine in the west, south to the United States border, and several kilometers east of the Richelieu River. RSB's educational and training facilities serve the residents of over 115 municipalities on the Montérégie. LBPSB is one of the largest school boards on the island of Montreal and one of the nine English-language school boards in the province. It is headquartered in Dorval, Quebec., [3], LBPSB is responsible for the English-language public schools located from Verdun, through the West Island and Ile Perrot, and into "mainland" territories stretching west to the Ontario border. The school partners comprise the main stakeholders in these school boards, including school principals, teachers, parents, students, school psychologists/mental

health workers, physical education experts, key administrators of each school board, and representatives of the involved schools.

Specifically, the educational leaders in our partnership include: **Somerville**, who is the former director of complementary services at RSB and its current research advisor; **Scroggins**, who is the current director of complementary services at RSB; **Racette**, who is the Director General of RSB and has been an educational leader in Quebec for over 20 years; and **Finn**, who is the current director of student services at Lester B. Pearson School Board. Each has created and integrated several clinical service platforms in their respective school boards. She has co-pioneered the use of community-based participatory research to develop and integrate school-based sleep promotion program in RSB schools. **Boursier**, who is a teacher with extensive experience in developing educational materials, and who is leading our lesson-development efforts. Over the years, we have benefited from the contributions of numerous school principals, teachers, special education experts, physical activity leaders, parents, and students.

The ABS Lab, which functions within McGill University and the Douglas Mental Health Research Center in Montreal, Canada, is dedicated to studying the role that sleep plays in multiple key processes underlying academic performance and mental health, and to developing non-pharmacological interventions that use this knowledge to improve the health and learning capacity of young persons. Our team of pediatric sleep experts includes Drs. **Brouillette, Gruber, and Wise**, who have extensive experience in addressing sleep issues in pediatric populations, along with various trainees in sleep and education. The goal of our community-university partnership has been to develop a means to take the knowledge gained from research regarding sleep and its positive impact on the health and learning capacity of young persons, and use it to promote the health and learning capacity of students by extending and improving their sleep. Our partnership has co-created two innovative school-based programs, *Sleep for Success* and *Healthy Nights and Healthy Days*, which promote the adoption of healthy habits to improve overall physical well-being, mental well-being, and academic success.

### 5. Barriers to integrating sleep health education into Quebec schools, and our solutions

Our group has encountered multiple barriers as we have attempted to develop school-based sleep education programs in Quebec. These barriers have stemmed from the realities and limitations faced by researchers and/or educators as they try to bridge the translational gap between research and the educational/school system. In the following section, we describe these barriers and the ways in which we have addressed them to successfully develop effective school-based sleep health interventions.

#### 6. Barriers related to researchers

##### 6.1. Barrier #1. Lack of Familiarity with the organizational/educational system into which the intervention will be integrated

As pediatric sleep researchers seeking to develop school-based sleep health education programs, we had an excellent understanding of sleep processes and their relevance to academic performance and health. We also had the ability to measure sleep and related outcomes, and we were committed to improving the sleep health of students. However, we lacked sufficient and nuanced understandings of key organizational factors of the local context into which we wished to integrate our intervention (eg, decision making processes and the daily realities of the schools and systems). This was a significant challenge, because such local factors

would critically impact the likelihood that a new intervention will be well received and/or sustained by a school's educators and administrators. Evidence has shown that even a well-developed and relevant intervention might not be accepted by the target schools if it does not take into consideration the local context. This is particularly relevant in Canada, given the decentralized nature of education and the discretion of individual schools and school boards to choose what they include in their programs as long as they stay within the relevant provincial guidelines.

### 6.2. Barrier #2. Insufficient information regarding the students' home environments and family contexts

In addition to the cultural, organizational, and physical school environment, the local circumstances of children in their home environments and family context, including the living conditions, noise levels, and sleeping arrangements, directly affect the children's lifestyle and sleep habit-related choices [56]. These factors should be taken into consideration when designing a program that aims to change children's lifestyles, as such consideration can increase the relevance, practicality, and applicability/acceptance of a potential sleep health program by students and their families, and increase the likelihood they will adhere to it. For this to happen, researchers must design a strategy that will allow them to identify relevant characteristics of the home and family environments in the target communities, and use this information to tailor the intervention to the local community [57,58].

### 6.3. Barrier #3. Lack of expertise related to effective instructional practices

Although our research team had ample expertise pertaining to sleep and to academic teaching, we lacked expertise related to effective instructional practices at the high school level. This was a challenge, as it could conceivably impact our ability to deliver an effective educational program and/or train educators on how to deliver the program.

### 6.4. Barrier #4. Lack of training in curriculum design

We conducted focus groups with schools educators in preparation for our development of a sleep health education program. The key information we obtained was that educators and schools have discretionary power to choose class materials as long as they meet the curricular requirements in terms of the covered competencies and the evaluation scheme used to grade students; thus, the most effective way to integrate sleep health into the school curricula would be by ensuring that the material could be incorporated into existing lesson plans. The developed lessons should thus meet the province-level curricular requirements and criteria. This represented a great opportunity and a practical strategy for integrating sleep health education in our schools' curricula. However, as a sleep research lab we lacked the knowledge and skills needed to create or modify curricula that comply with local (province-wide) requirements.

## 7. Barriers related to educators

### 7.1. Barrier #5. Time pressure on educators

Time pressures related to busy curricula and the lack of surplus teaching time that could absorb a new program represented a significant barrier to the ability of our school partners to engage in disseminating preventative information pertaining to healthy sleep. In addition, the educators on our team did not have adequate

opportunity to acquire novel relevant information regarding sleep or deliver that information to their students.

### 7.2. Barrier #6. Multiple competing health domains need to be covered by school health curricula

Another obstacle was related to the reality of Quebec schools, in which an ever-increasing number of health domains are perceived as being essential for the success and wellbeing of students. Our partner educators were unsure how to prioritize or integrate competing priorities, such as sex education, healthy eating, physical activity, and more. In many jurisdictions in Canada, the importance of student health and wellbeing (and occasionally the importance of sleep health) has been acknowledged, but many provinces lack a comprehensive approach to promoting and teaching physical and mental wellness as ingredients to student success. Although it would be ideal to address each of these domains, this is not feasible when no curricular time is designated for such activity.

### 7.3. Barrier #7. Educators have limited knowledge regarding sleep regulation, processes, and related outcomes

Most of the educators in our schools had not been trained regarding the importance of sleep, the impact of insufficient sleep, or the appropriate interventions that can help improve the sleep health of students. As a result, they lacked both awareness and knowledge of how sleep impacts several critical domains related to academic performance, and did not have the tools to help students and families make healthy sleep a part of their daily lives.

### 7.4. Barrier #8. Educators' professional boundaries and scope of practice

An additional barrier to the implementation of sleep health programs in Quebec schools was the issue of professional boundaries and scope of practice. Whereas all educators and school personnel share the mission of improving student wellness and academic success, they each have their own roles. Teachers frequently see their main goal as teaching, and may view issues such as improving sleep health as being the responsibility of other members of the school team. This challenged our integration of sleep health education into regular teaching time in our partner schools: some schools considered health promotion to be part of physical education, some expected a health professional (eg, a school nurse or psychologist) to do this job, and some had a team member designated for such a role. Hence, educators who do not view health promotion as part of their professional duties could be very supportive of the overall idea while feeling uncomfortable about getting involved or seeing it as being beyond the scope of their professional duties.

## 8. Solutions: our approach to addressing the barriers to integrating sleep health education into Quebec schools

To address the multiple barriers we encountered as we attempted to integrate sleep health curricula into schools in Quebec, our partnership adopted the principles of Community Based Participatory Research. This refers to a process in which stakeholders and researchers integrate their expertise in all relevant domains and are mutually engaged throughout the entire research process. In the case of our partnership, McGill researchers and the stakeholders from the school boards have contributed their respective expertise in education, sleep, and all aspects of quantitative and qualitative research, and have joined forces to shape the process of developing, implementing, and evaluating our school-

based sleep health education programs. This process produced programs that were relevant to and applied by the participating schools, used evidence-based approaches in developing the sleep curricula, and applied objective measures and valid research design when evaluating the interventions (for more details see Refs. [59–61]). In the next section, we describe how this approach allowed us to successfully address the barriers mentioned above. We expect this information to be useful to other groups who might face some of the same challenges.

#### 8.1. *Overcoming barrier #1. Understanding the organizational culture into which the intervention will be integrated*

Our partnership used several strategies to ensure that we understood the organizational culture of our partner schools, as follows: 1) We created a Community Action Board (CAB) that had dual leadership comprising academic and community partners at multiple levels, including “front-line” teachers, parents, students, and decision makers. The CAB led a process of co-learning and co-teaching between the school and academic partners that resulted in a mutual understanding of both environments and the development of a shared process for solving the key challenges described above. The involvement of an experienced team of educators, school board administrators, and stakeholders provided our partnership with the means and knowledge needed to improve our understanding of the educational system and ensure that the program we developed would be tailored to the needs and characteristics of the families and the students in our partner schools. 2) The CAB held focus group meetings with relevant stakeholders (teachers, school principals, students, parents, administrators, and mental health specialists) and obtained details on the perceptions, insights, attitudes, experiences, and beliefs of key stakeholders that were incorporated into the developed programs. 3) Researchers presented information regarding research designs and the qualitative and quantitative methods used to study sleep and intervention outcomes, explained the research tools and questionnaires, and helped to demystify the research process.

#### 8.2. *Overcoming barrier #2. Understanding the students' home environments and family contexts*

To develop familiarity with the local circumstances and make an effort to adapt the program to the needs, cultural characteristics, and preferences of our community partners, our academic partners led the partnership in conducting a pre-intervention scan to characterize the family and home environments as they relate to the students of our school boards, family-level sleep practices and environments, sleep habits, the level of sleep knowledge, and the presence/absence of certain skills needed to implement proper sleep hygiene.

#### 8.3. *Overcoming barrier #3. Expertise related to effective instructional practices*

The sleep experts identified essential sleep content and interventions, and our team of educators designed activities that relayed this knowledge to students in ways that were meaningful and motivational for them. Specifically, our educators chose to use an experiential learning approach, which is an educational approach that provides students with competencies needed for real-world success by addressing real-world problems and situations through teacher-directed and facilitated learning [62]. The classroom materials were not lecture-based, but rather consisted of group projects and activities that allowed students to develop their

own ideas, integrate concepts highlighted in the program materials, and discuss the importance of their habits with peers.

#### 8.4. *Overcoming barrier #4. Lack of training in curriculum design*

The team of educators led the creation of programs that complied with the requirements of the Quebec Ministry of Education, which included the need to adapt for students' diverse learning styles and strategies, develop critical and creative thought, and develop cross-curricular competencies while fully meeting the developmental needs of the children.

#### 8.5. *Overcoming barrier #5. Educators' time pressure*

Once the program was finalized, the research team produced and prepared all of the necessary materials and the school board allocated release time for teachers to be trained on the final version of the program. This strategy meant that the busy teachers did not have to spend time preparing materials. Also, since the program was developed to adhere to Quebec's curriculum requirements, the teachers did not have to find “surplus” time to deliver the information to their students, but rather could use the material during their regular teaching time.

#### 8.6. *Overcoming barrier #6. Educators' limited knowledge regarding sleep regulation, processes, and related outcomes*

Our school partners dedicated several of their *pedagogical* days and paid for release time so our partner educators and school board members could participate in workshops and training provided by the research team. The participants benefited from the sleep team's knowledge and understanding regarding the importance of sleep, the impact of insufficient sleep, and interventions that may be used to improve students' sleep health. The educators acquired awareness and knowledge regarding the impact of sleep on several critical domains related to academic performance, and now prioritize the need to help students and families make healthy sleep a part of their daily lives.

#### 8.7. *Overcoming barrier #7. Multiple competing health domains need to be covered by the schools' health curricula*

The health curricula of the target schools were assessed to determine whether sleep education appeared in any of the existing modules and, if so, what information was included. This information guided the educators, as they were able to prioritize the information deemed to be most relevant to their school board communities.

#### 8.8. *Overcoming barrier #8. Educators' professional boundaries and scope of practice*

Members of the CAB held discussions, led focus groups, and conducted interviews with the schools' educators and decision makers, seeking to identify the professionals within the schools who would be most able to participate in all stages of the research, from designing the curriculum to delivering the intervention and collecting data for program evaluation.

Using these strategies, we successfully developed school-based sleep health interventions tailored to the developmental and cultural characteristics of our target populations. The use of Community Based Participatory Research provided us with the means to successfully translate research findings into effective interventions that improved the sleep and academic performance of youth in the involved communities [For detailed information regarding the

Program please see Ref. [62]]. Our work received the 2012 Canadian Psychological Award For Distinguished Contributions to Public or Community Service, and the Institut National de Santé Publique du Québec invited us to produce a document describing the importance of sleep for health and success. A section of this document was integrated into the Quebec Healthy Schools manual, in the hopes of promoting sleep education as an integral component of health.

### 9. Future directions for school-based sleep health education in Canada

Local partnerships like ours are excellent structures for advocating for policy change a local level, for working to share resources, and for offering continued professional learning. However, advocating for the integration of sleep health education into school curricula across Canada is a greater challenge, as it rests in the hands of policy makers and school systems across the country. Moreover, addressing sleep health in the school setting is only just beginning to be widely accepted as an important prevention initiative. Although Public Health Canada has recognized sleep deprivation as a public health epidemic, sleep health has not yet been prioritized by the Canadian Ministries of Health and Education. Until such recognition occurs, it will be difficult to obtain the resources needed to support the development, integration, and sustainability of school-based sleep health programs, or to make schools receptive to the idea of adding such content into their current lesson plans, given their already busy schedules and existing priorities.

### 10. How can we effect change in the Canadian school systems?

This section seeks to suggest initial strategies for catalyzing change in the Canadian school system across provinces that will result in the prioritization of sleep health education into schools' strategic plans across the country in order to promote healthy sleep to all Canadian youth.

### 11. Development of tools

**Developing feasible evidence-based strategies to promote healthy sleep for youth through the school system.** Although some progress has been made with regards to the development of evidence-based tools for sleep health promotion in Canadian schools, multiple gaps and needs remain. These include the integration of effective sleep health promotion into a broader curriculum, which would allow educators and students to focus on sleep as a priority while integrating it into other domains of life. Such initiatives would ideally be developed by coalitions of policy makers, educators, school administrators and sleep experts across Canada to maximize uptake and Canada-wide dissemination. In addition, the discourse on sleep health and related tools should be extended to all stages of development, ranging from preschools and daycare facilities to colleges and universities, and should ultimately lead to the development of healthy sleeping guidelines for these sectors.

### 12. Advocacy

**Collaborate with national organizations seeking to optimize youth physical, mental, and cognitive health to raise awareness to the importance of sleep.** We believe that the need to provide schools with effective tools to address the sleep health of students should be declared a critical priority by national organizations seeking to optimize the physical, mental, and cognitive health of

Canadian youth, such as the Mental Health Commission of Canada's Youth Council [63], the Canadian Association of School System Administrators and school-based mental health organizations [64,65].

**Inform and Work With Educational Policy Makers.** Efforts should be made to influence the integration of sleep health education into provincial and local educational policies. This could be facilitated by the preparation of policy briefs for government decision makers. Working with the Council of Ministers of Education Canada (CMEC), an intergovernmental body that brings officials from each of the provincial/territorial ministries of education together to discuss policy issues and undertake projects, would be one avenue to explore. These briefs should include informed and critical analysis on academic, behavioral, emotional and physical issues that are affected by sleep, and on the short- and long-term benefits of improved sleep.

### 13. Empowerment of educators

**Sleep-related information and skills should be incorporated into the training given to educators and school administrators,** so that such knowledge can form part of their professional practice. This might be feasible through pre-service teacher training programs provided by universities or ongoing in-service professional development offered to teachers by school boards. Such training would provide interested certified teachers with knowledge, skills and tools to improve sleep health in students of all ages.

### 14. Summary

This manuscript describes the rationale and potential benefits of integrating sleep health education into the school system, along with the challenges and potential solutions for achieving this goal. Although the old saying "Early to Bed and Early to Rise Makes You Healthy, Wealthy, and Wise" has been common wisdom for generations, this message is largely missing from modern curricula. Successful school-based sleep health promotion programs hold the promise of having long-lasting positive impacts on the physical and mental health of students, thus improving their academic performance and daytime functioning.

### Conflict of interest

The ICMJE Uniform Disclosure Form for Potential Conflicts of Interest associated with this article can be viewed by clicking on the following link: <https://doi.org/10.1016/j.sleep.2019.01.037>.

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