

Université de Montréal

School Culture and Social Inequalities in School-Based Health Promoting Interventions  
in Québec Elementary Schools

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*Cette thèse intitulée*

**School Culture and Social Inequalities in School-Based Health Promoting Interventions  
in Québec Elementary Schools**

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## Résumé

**Contexte :** Les interventions de promotion de la santé (IPS) en milieu scolaire visent à soutenir le développement des jeunes et promouvoir l'adoption de modes de vie sains. Une culture scolaire promotrice de santé a été identifiée comme un facteur facilitant l'adoption, la mise en œuvre et l'efficacité des interventions. Toutefois, la culture scolaire peut varier d'une école à l'autre, particulièrement dans celles accueillant des élèves issus de milieux défavorisés, et des inégalités dans l'offre d'IPS risqueraient d'exacerber les inégalités de santé existantes. Un écart de connaissances persiste sur les inégalités sociales dans la culture scolaire et l'offre d'IPS dans les écoles desservant des élèves de statut socio-économique différent.

**Objectifs :** L'objectif était d'étudier les associations entre le niveau de défavorisation de l'école, la culture scolaire et la disponibilité d'IPS. Nous avons cherché à: (1) quantifier l'association entre la défavorisation de l'école, l'importance de problématiques de santé et la disponibilité d'IPS; (2) quantifier l'association entre la défavorisation de l'école et la culture scolaire promotrice de santé. Les résultats de l'objectif 1 ayant montré un gradient social dans la disponibilité d'IPS en matière de santé mentale, nous avons approfondi pour: (3) quantifier l'association entre des variables du contexte scolaire et la présence d'IPS de santé mentale; (4) les caractériser par rapport aux meilleures pratiques (ex. approche globale, optimisation de la culture scolaire).

**Méthodes :** Les données sont tirées de PromeSS, une étude transversale comprenant 171 écoles primaires du Québec, Canada (2017-2019). Quatre mesures d'une culture scolaire promotrice de santé ont été développées à partir du modèle théorique «Health Promoting Schools». Des modèles de régression logistique, ANOVA unidirectionnelle et tests de Tukey ont servi à estimer les associations entre les variables d'intérêt. Des données approfondies sur un échantillon de 25 IPS de santé mentale ont été analysées dans le cadre d'une analyse de cas croisés.

**Résultats :** Les écoles défavorisées ont signalé plus de problématiques de santé que les écoles favorisées. Les proportions d'IPS disponibles étaient similaires, sauf pour les IPS de santé mentale offertes en plus grande proportion dans les écoles favorisées. Les écoles favorisées avaient une culture scolaire plus promotrice de la santé que les écoles défavorisées, principalement en termes d'engagement avec les familles et la communauté. Les écoles plus susceptibles de mettre en œuvre des IPS de santé mentale étaient les écoles favorisées, ayant une culture scolaire plus promotrice de santé et où les problématiques de santé mentale étaient considérées comme importantes. Bien que généralement bien adaptées à leur contexte, peu d'IPS de santé mentale étaient alignées avec les meilleures pratiques.

**Conclusions :** Cette thèse illustre l'importance du contexte dans lequel les IPS sont mis en œuvre, incluant la culture scolaire comme caractéristique essentielle pour des IPS efficaces et les conditions socioéconomiques des élèves. La capacité des écoles à établir une culture scolaire promotrice de santé et à mettre en œuvre des interventions fondées sur les données probantes devrait être renforcée, en particulier pour les écoles défavorisées, afin d'améliorer la santé des élèves et de réduire les inégalités.

**Mots-clés :** promotion de la santé, école primaire, interventions, inégalités sociales, culture scolaire, École promotrice de santé, étude transversale.

## Summary

**Background:** School-based health-promoting interventions (HPIs) are key components of public health strategies that aim to support youth development and promote the adoption of healthy lifestyles. A health-promoting school culture, which represents the school's context for HPI implementation, has been identified as a facilitator of HPI adoption, implementation, and effectiveness. However, school culture may vary across schools and in particular, schools serving students from disadvantaged backgrounds which face known challenges for HPI implementation. Inequalities in school culture and HPI programming may exacerbate existing health inequalities across disadvantaged versus advantaged settings. Yet little is known about social inequalities in school culture or HPI availability across schools serving student populations of varying socio-economic status.

**Objectives:** The aim of this dissertation was to investigate the associations among school deprivation, school culture and HPI availability. Specifically we aimed: (1) to quantify the association between school deprivation and each of perceived importance of health issues and HPI availability; (2) to quantify the association between school deprivation and health-promoting school culture. Because results from objective 1 showed a social gradient in the availability of mental health HPIs, we delved deeper: (3) to quantify the association between school context variables and the availability of mental health HPIs; and (4) to characterize them according to their alignment with best practices for effective school-based mental health promotion.

**Methods:** Data were drawn from the PromeSS study, a cross-sectional survey of school principals including 171 elementary schools across Québec, Canada (2017-2019). Four measures of a health-promoting school culture were developed drawing from the Health Promoting Schools theoretical model. Logistic regression models, one-way ANOVA and post-hoc Tukey tests were used to

estimate associations between school deprivation, health-promoting school culture, importance of health issues, and HPI availability. In-depth data on a sample of 25 mental health HPIs implemented in study schools were analyzed in cross-case analysis.

**Results:** The three articles that comprise this thesis show that: (1) disadvantaged schools reported more health issues as important than advantaged schools, but similar proportions of HPIs, except for mental health HPIs (a higher proportion of advantaged schools reported offering one in the past year); (2) advantaged schools had a more health-promoting school culture than disadvantaged schools, primarily in terms of engagement with families and the wider school community; (3) in the case of mental health promotion, advantaged schools, schools with a more health-promoting school culture, and schools where mental health issues were seen as important were more likely to implement mental health HPIs; and (4) although schools generally implemented interventions that were highly tailored to their context, few mental health HPIs were aligned with best practices for effective mental health promotion (e.g., whole-school approach, optimization of school culture).

**Conclusion:** This thesis suggests that the context in which school-based HPIs are implemented matters, including student socioeconomic conditions. It strengthens empirical support for health-promoting school culture as a crucial feature for effective HPIs. School capacity for establishing a health-promoting school culture and implementing evidence-based interventions should be reinforced, especially for disadvantaged schools to improve student health and reduce inequalities.

**Keywords:** health promotion, elementary school, interventions, social inequalities, school culture, Health Promoting Schools, cross-sectional study.

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## **List of abbreviations**

CDC = Centers for Disease Control

CSH = Comprehensive school health

ÉS = École en santé

HPI = Health-promoting intervention

HPS = Health Promoting Schools

HS = Healthy School

IMSE = Indice de milieu socio-économique

IPS = Intervention de promotion de la santé

JCSH = Joint Consortium for School Health

MEES = Ministère de l'éducation et de l'enseignement supérieur

MHPI = Mental health-promoting intervention

SES = Socioeconomic status

SHE = Schools for Health in Europe

WHO = World Health Organization

*“We rise by lifting others.”*  
*Robert G. Ingersoll.*

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## **CHAPTER 1. INTRODUCTION**

For decades, schools have been recognized as key settings for health promotion (Bartelink et al., 2022; St Leger et al., 2007). Schools are part of a child's microsystem, which is defined in socio-ecological theory as the immediate environmental setting experienced by the child, and the innermost and most influential of the multiple layers of systems influencing their development (Bonell et al., 2013; Bronfenbrenner, 1979). Interventions to prevent noncommunicable diseases and support youth development can be delivered directly in the school environment (Lohrmann, 2008). Additionally education is a key determinant of adult health, and children in good health are better positioned to succeed in school (Veugelers & Schwartz, 2010). Because most children from a variety of socio-economic and cultural backgrounds spend a substantial part of their time at school, school health promotion has the potential to reduce health inequalities among children (Bartelink et al., 2022).

For decades, school health promotion has been hindered because of fragmented and uncoordinated approaches combined with the relatively low priority ascribed to health goals by the education sector (Bartelink et al., 2022). It is important to understand how to improve the delivery of school-based health promotion to ensure that schools can attain their full potential for students' health, education and development equally for all children (Tang et al., 2009). This thesis contributes to the body of knowledge necessary to achieve this goal by providing better understanding of the landscape for school-based health promoting interventions (HPIs) according to school deprivation, and by exploring how school context (including school culture) relates to the delivery of HPIs. The current chapter introduces the research problem and thesis objectives.

## **1.1 Research problem**

### ***1.1.1 Burden of noncommunicable diseases***

Noncommunicable diseases are increasing globally at epidemic rates, causing rising numbers of premature deaths and preventable morbidities and disabilities (Hajat & Stein, 2018). Worldwide, it is estimated that three in five deaths are attributable to four diseases (i.e., cardiovascular disease, diabetes, chronic lung diseases, and cancer) (Wang et al., 2016) and that 20-30% of adults suffer from more than one chronic disease (Marengoni et al., 2011). In Canada, in 2015, the leading causes of death were cancer (29% of all deaths) and cardiovascular disease (27%), and a third of Canadians suffered from at least one chronic disease (Branchard et al., 2018). Chronic diseases account for over \$90 billion a year in direct medical costs and indirect productivity losses in Canada (Public Health Agency of Canada, 2013). Overall, noncommunicable diseases have been recognized as a major burden on the healthcare system requiring urgent attention.

Noncommunicable diseases are mostly related to modifiable lifestyle behaviours (Héroux et al., 2012; Kukreti et al., 2021). Four risk factors (i.e., unhealthy eating, physical inactivity, cigarette smoking and alcohol consumption) are responsible for two-thirds of these diseases (Beaglehole et al., 2011; World Health Organization, 2014) and often co-occur with a substantially increased risk of mortality (Kukreti et al., 2021; Loeff & Walach, 2012; Noble et al., 2015). Interventions that aim to reduce the burden of noncommunicable diseases should therefore include an important focus on improving these modifiable behaviors and in addition they should take their co-occurrence into consideration.

### ***1.1.2 Health inequalities***

Behavioural, morbidity, and mortality outcomes are not equally distributed across populations. Social inequalities in health are defined as systematic differences in health between different social groups within a society (Whitehead, 2007). These inequalities are not restricted to differences between the highest and lowest social groups, but rather follow a stepwise gradient pattern, with incremental improvements in health as socioeconomic status (SES) increases (Braveman et al., 2011). Decades of research examining associations between socioeconomic factors and health outcomes throughout the life course overwhelmingly link greater social disadvantage with poorer health (Braveman et al., 2011; Jemal, 2018; Kröger et al., 2015; Mackenbach et al., 2008).

The distribution of disease and of risk factors disproportionately affects lower SES individuals. SES represents an individual's position as defined by social and economic factors (Galobardes et al., 2006). Social inequalities are thought to be caused by a systematic unequal distribution of power, income, goods, and services (Commission on the Social Determinants of Health, 2008). Differences in income, wealth, level of education, occupation, race, and neighborhood can lead to different exposures to risk factors for health issues, different access to healthcare (Braveman et al., 2011; Galobardes et al., 2006), different opportunities for social mobility, different levels of allostatic load (i.e., “wear-and-tear” effects on physiological regulatory systems in response to chronic social and environmental stress (Danese & McEwen, 2012; M. Seeman et al., 2014; T. Seeman et al., 2010)), and different levels of knowledge and skills allowing control over health (Link & Phelan, 1995). SES in adulthood is associated with childhood socioeconomic circumstances (Galobardes, 2004), leading to an increased likelihood of health and social consequences of socioeconomic disadvantage that can be reproduced from one generation to the

next (Braveman & Barclay, 2009). Because such health inequalities can be prevented or reduced by collective action, they may be deemed unjust, inequitable, and unacceptable (Canadian Institute for Health Information, 2016; Public Health Agency of Canada, 2016; Whitehead, 2007). These social-level factors influence individual health and lifestyle behaviors and require priority remedial action.

### *1.1.3 Life-course perspective*

In a life-course perspective (Lynch & Smith, 2005), most health inequalities are thought to begin in the earliest periods of life and even before (Pembrey et al., 2014; Smith et al., 1994; Spencer et al., 2019; Walker et al., 2011). The accumulation of risk model posits that across this timeframe, health damage intensifies in a dose-response relationship, with increasing damage as exposures multiply in number and duration (Galobardes, 2004; Lynch & Smith, 2005). A cumulative effect occurs with the clustering of exposures (e.g., individuals in lower SES groups are more likely to be exposed to environmental pollution, cigarette smoke, and to have fewer opportunities for physical activity in their neighborhood and fewer educational opportunities) and escalation of exposures over time (e.g., individuals with lower education levels are more likely to work in an occupation with lower income and a higher risk of toxic exposures) (Galobardes, 2004; Lynch & Smith, 2005; Moore & Littlecott, 2015). This effect is noticeable intergenerationally: as a result of socioeconomic influences on health throughout the life-course, parental SES influences an individual's SES and health behaviors in adulthood and their children's in turn (Cheng et al., 2016; Pampel et al., 2014). In Québec, intergenerational reproduction of social inequalities has notably been documented in terms of education: the rate of young adults going to university is three times

higher among those whose parents have a university education, compared to those whose parents completed high school only (Kamanzi, 2019).

Health inequalities can be further exacerbated during certain sensitive periods such as childhood (Braveman & Gottlieb, 2014; Lynch & Smith, 2005; Smith et al., 1994). Experiencing poorer socioeconomic circumstances in childhood is associated with a higher risk of all-cause mortality in adulthood (Galobardes, 2004) and worse health and quality of life, regardless of adult SES (Berthung et al., 2022; Braveman & Gottlieb, 2014; Lawlor et al., 2004; Van De Mheen et al., 1998). Accumulating evidence demonstrates that stressful experiences in childhood, particularly when chronic, also have measurable physiological effects. Childhood stress can cause dysregulation of inflammation pathways which can foster chronic disease in adulthood (Braveman & Barclay, 2009; Kelly-Irving et al., 2013; Miller et al., 2011), and childhood SES has been associated with epigenetic changes in DNA measured in adulthood (Borghol et al., 2012). In addition to biological pathways, the association between childhood SES and adult health can also be explained in part by behavioral factors (Lawlor et al., 2004; Van De Mheen et al., 1998). For example, poor socioeconomic circumstances may influence food regulation behaviours: in a psychological science study, individuals who grew up in high-SES environments were more likely to regulate the quantity of food they ate in relation to their energy need (i.e., they reduced their food intake when their energy needs decreased) but individuals who grew up in low-SES environments were less likely to do so (Hill et al., 2016). This is compelling evidence of the influence of childhood socioeconomic conditions on behavioral risk factors and health status across the life-course.



In addition to the longitudinal effects of life-course exposures, health inequalities are already apparent early in life. Children born into low-SES families are at increased risk of low birth weight, preterm birth, infant mortality and chronic conditions than children born into high-SES families (Spencer et al., 2019). Within the first few months of life, differences in health status are already noticeable between children from more privileged families and children from underprivileged families (Halle et al., 2009; Heckman, 2008; Paquet et al., 2001). Poor socioeconomic circumstances are also associated with lower developmental scores and a higher risk of multiple health problems during childhood, including respiratory illnesses (Bradley & Corwyn, 2002), brain development issues (Luby et al., 2013; Walker et al., 2011), and obesity and overweight (Spencer et al., 2019). In Canada, in 2010-12, the proportion of childhood developmental vulnerability<sup>1</sup> was 2.2 times higher in the most materially and socially deprived neighborhoods as in the least deprived neighbourhoods (Public Health Agency of Canada, 2018). If every child enjoyed the same healthy development as those living in the highest-income neighborhood, there would be 7 511 fewer cases of developmental vulnerability in Canadian kindergarten children annually (Public Health Agency of Canada, 2018). In the province of Québec specifically, developmental vulnerability at kindergarten age is also associated with parental educational attainment (Laurin et al., 2012). These data show the importance of addressing health inequalities early in life and throughout childhood before such issues worsen and inequalities widen. While early intervention is critical,

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<sup>1</sup> Childhood developmental vulnerability is defined as the “crude percentage of kindergarten children (ages 4-6 years) who are vulnerable in  $\geq 1$  of the following developmental domains upon entry into school: Physical health and well-being (physical readiness for the school day, physical independence, gross and fine motor skills); Social competence (overall social competence, responsibility and respect, approaches to learning, and readiness to explore new things); Emotional maturity (prosocial and helping behaviour, anxious and fearful behaviour, aggressive behaviour, and hyperactivity and inattention); Language and cognitive development (basic literacy, interest in literacy/numeracy and memory, advanced literacy, and basic numeracy); Communication skills and general knowledge.” (Public Health Agency of Canada, 2018)

continued intervention is needed throughout childhood and adolescence to ensure a reduction in health inequalities.

## **1.2 Addressing health inequalities and modifiable risk factors**

Given that health inequalities are apparent from preconception, and that the gap widens over time as genetic, environmental and social influences are compounded (Braveman & Barclay, 2009), public health strategies in early life represent the most effective and cost-efficient focus for interventions to reduce health inequalities (Center for the Developing Child, 2007; Walker et al., 2011). Early life intervention can help establish the roots of good health; mitigate the effects of childhood adversity on children's physical, cognitive, emotional, and behavioral development; and help shape healthy lifestyle behaviours before at-risk behaviours become entrenched (Braveman et al., 2011; Carrilero et al., 2021).

Despite significant efforts in the last decades to improve population health, health inequalities remain deep-seated in Canada and elsewhere. Innovative solutions are needed so that health promotion efforts attain and benefit all children, and especially those with the most to gain. As outlined in the Closing the Gap report by the WHO Commission on the Social Determinants of Health (2008), intersectoral action (defined as organized action and policy among health and non-health sectors) is key to achieve health equity. In 2014, the World Health Organization underlined a need for new approaches to address diet and exercise, overweight and obesity, tobacco and alcohol use, mental health, personal injury prevention, and violence (World Health Organization, 2014), followed in 2017 by implementation guidance calling for cooperation among all sectors of society, and especially the education sector (World Health Organization, 2017).

Schools are an ideal setting to capitalize on the collaboration between health and educational actors to reach all children, regardless of SES, in an environment where they spend most of their time. School-based health-promoting interventions (HPIs) are key components of public health strategies that aim to support youth development, help acquire vital health competencies, and influence adoption of healthy lifestyles (St Leger et al., 2007). School-based health promotion may represent a more coherent approach to chronic disease prevention by intervening directly in the children's environment. However, it has long been relatively neglected, fragmented and uncoordinated (Bartelink et al., 2022), and little is known about how social inequalities may influence HPI programming.

Increasingly, researchers have highlighted that implementation of school-based HPIs varies depending on the context of the school (Domitrovich et al., 2008; Fair et al., 2018; Lyon et al., 2018; MacNeil et al., 2009; McIsaac et al., 2017). School culture is part of this context, and is defined as the way a school functions and the shared values, norms, beliefs and behaviours among staff, students and the school community (Domitrovich et al., 2008; MacNeil et al., 2009). However, evidence-building on school culture for health promotion is hindered by a lack of consensus on its measurement (Lucarelli et al., 2014) and a lack of theoretical foundations that can help explain how school culture can be leveraged (Aveyard et al., 2004). Additionally, few studies have investigated the role of school culture in relation with social inequalities.

Research is needed to map HPI availability and explore whether HPIs respond to student needs, whether they are distributed equitably in advantaged and disadvantaged schools, and the contextual factors that influence the implementation of effective interventions (including school culture).

### **1.3 Objectives and organization of this dissertation**

The overall aim of this dissertation was to investigate the associations among school deprivation, school culture, and HPI availability in elementary schools in Québec, Canada. For the purpose of this dissertation, we studied HPIs (whether or not they are implemented as part of a whole-school approach) and elementary schools (i.e., defined as schools serving students from kindergarten to grade 6 (i.e., students between the ages of 5-12)).

To do so, we drew data from PromeSS, a cross-sectional study of health-promotion programming in Québec elementary and high schools. The objective of the PromeSS study was to examine social inequalities in school-based health-promoting programming in the province of Québec. The sampling frame for PromeSS included all 1087 elementary schools and 469 high schools from all public school boards (now called service centers) in the province of Québec. Schools were recruited in two steps by first obtaining approval from school boards, and then from individual schools. The final PromeSS sample comprised 171 elementary schools and 48 high schools and each school was invited to nominate the principal or another staff as a school informant. This thesis is distinct from the wider PromeSS study in three ways: (i) I focused my research on elementary schools; (ii) I developed and conducted new research objectives on school culture; and (iii) I situated my work within a different theoretical framework than the original PromeSS study protocol – the PromeSS conceptual model drew on Roger’s theory of Diffusion of Innovations

(Rogers, 1983), which I modified to incorporate concepts from socio-ecological theory (Bronfenbrenner, 1979). I also drew on the Health Promoting Schools framework (World Health Organization, 2018) for *Articles 2* and *3*.

### ***1.3.1 Description of thesis chapters***

The first chapter of this dissertation (Introduction) served to present the extent of the problem with respect to the burden of health inequalities and the rationale for early life intervention through school-based health promotion. Overall objectives of the dissertation and an outline of subsequent chapters are described.

The second chapter (Literature Review) presents a detailed review of the evidence on school-based HPIs, school culture, and social inequalities. Following a brief overview of the definition and historical development of school-based health promotion, I present theoretical frameworks for school-based health promotion; review the empirical evidence on effectiveness of school-based HPIs as well as the challenges for their evaluation; present definitions and models for the conceptualization and measurement of school culture; summarize the limited number of studies investigating social inequalities in relation to school-based health promotion and school culture; and discuss existing gaps in the literature.

The third chapter (Objectives) presents the general and specific objectives of this dissertation.

The fourth chapter (Methods) describes the PromeSS Study dataset in more detail and outlines the variables and analytical methods used in this dissertation.

The fifth chapter (Results) includes the three empirical articles that constitute this dissertation. Two have been published in peer-reviewed journals and one is in preparation for submission. In *Article 1*, “Social inequalities in availability of health-promoting interventions in Québec elementary schools”, we investigated the perceived importance of health issues and the availability of HPIs in schools serving advantaged, moderately advantaged, and disadvantaged students. In *Article 2*, “Health-promoting school culture: How do we measure it and does it vary by school neighborhood deprivation?”, we developed four scales to measure dimensions of a health-promoting school culture in the PromeSS sample. We then examined the association between social and material deprivation in the school neighborhood and each dimension of health-promoting school culture. In *Article 3*, “Availability of mental health promoting interventions in elementary schools: school context correlates and alignment with evidence-based practices”, building on findings from the two previous articles, we investigated potential correlates of the availability of mental health HPIs. We then characterized a sample of 25 mental health HPIs implemented in PromeSS study schools and assessed whether their characteristics and implementation process aligned with established best practices identified in the literature.

I am principal (first) author on all three of these research articles. In addition to contributing to data collection and curation for the PromeSS study, for each of these articles I conceptualized the research questions, conducted literature reviews of existing studies, developed the objectives and analytic plan, analyzed the data, interpreted the results, and wrote, reviewed and revised the manuscript. The co-authors helped refine the research questions and objectives, interpret the

results, discuss implications of the findings, and provided critical feedback on drafts of the manuscripts.

The sixth chapter (Discussion) presents cross-cutting themes to synthesize findings from the three empirical articles and discuss them in relation to the literature.

Finally, the seventh chapter (Conclusion) concludes the dissertation and outlines implications and future research avenues for school-based health promotion.

## **CHAPTER 2. LITERATURE REVIEW**



In a 2007 statement and call for action resulting from a World Health Organization (WHO) Technical Meeting, international experts recognized that schools are not only essential settings for teaching and learning, but also as community resources “to promote health and development for children, families and teachers” (Tang et al., 2009). They called for increased leadership at the national, community and school level and highlighted key challenges for the field, including the need to strengthen implementation processes and to alleviate social and economic disadvantage. The thesis objectives are in line with these two challenges and build on a growing body of school health promotion literature. The aims of the current chapter are: (1) to situate school-based health promotion historically, theoretically and empirically; (2) to explore how school culture has been conceptualized in previous research relating to implementation of health promotion programming; and (3) to map extant research on social inequalities in this realm and identify knowledge gaps which the thesis will address.

## **2.1 School-based health promotion**

### ***2.1.1 Definition***

School-based health promotion permits intervening on both modifiable causes of chronic disease early in life and social inequalities concurrently. Defined as any structured and planned activity undertaken to improve and/or protect the health of students (and staff) (St Leger et al., 2010; Young et al., 2012), it encompasses health education (i.e. communication of information related to health), delivery of interventions to develop skills and competencies, and activities related to school policies and the school environment (St Leger et al., 2010). In this section, I introduce the chronology of events that shaped school-based health promotion in the last century; describe

theoretical frameworks underpinning this approach; summarize the evidence for effectiveness; and discuss known factors that may facilitate or hinder implementation and effectiveness.

### ***2.1.2 Historical perspective***

School-based health promotion has existed since attendance at school became compulsory in the 19<sup>th</sup> century in many high-income countries (St Leger, 2004). Initially, the emphasis was on hygiene to prevent infectious diseases – visiting medical professionals would teach students about hand washing and the importance of using water from uncontaminated sources (St Leger, 2004; St Leger et al., 2007). Gradually the focus shifted to health-at-large, and by the 1950s school staff started addressing health topics such as physical activity, oral health, nutrition, sexual health and drug use in the classroom (St Leger, 2004). These actions were mainly aligned with a health education approach. Teachers often had to relay information and materials they received with little or no training (Langford et al., 2014; St Leger, 2004). Criticism of this approach included the narrow definition of health and the focus on physical diseases and cures (Barnekow et al., 2006), the premise that health knowledge could be transmitted to students as passive recipients of information rather than as active learners (Roberge & Choinière, 2009; Young, 2005), a lack of consideration of the influence of the social and physical environment on individuals' health (St Leger et al., 2010), the assumption that knowledge acquisition directly led to behaviour change (which has since been criticized as oversimplistic) despite limited potential for effectiveness without environmental changes (Bartelink et al., 2022; Bonell et al., 2013; Désy, 2009; Lynagh et al., 1997; St Leger, 2004), the stratification of topics addressed separately rather than holistically, and the risk of overloading school staff with externally developed HPIs that they felt little ownership over (Bartelink et al., 2022). At the time, many were still skeptical that schools could

have an impact on population health (Young, 2005). A different approach was needed to redefine health promotion in schools in order to attain greater impact.

The overarching approach to school-based health promotion changed in the 1980s, during which the Ottawa Charter for Health Promotion cemented a new definition of health promotion as “the process of enabling people to increase control over, and to improve, their health” (World Health Organization, 1986), and outlined strategies for health promotion (i.e., building healthy public policy, creating supportive environments, strengthening community action, developing personal skills, and reorienting health services). This charter marked an important shift from a focus on individual behaviour to recognizing the wider social, political, and environmental influences on health (Désy, 2009; Langford et al., 2014). This led to the materialization of the Health Promoting Schools (HPS) framework, whereby health is promoted through the whole school environment and not just through ‘health education’ in the curriculum (Bada et al., 2019; Langford et al., 2014; Young, 2005). Involving all school stakeholders would enable identification of needs specific to the school, higher adaptation of interventions to the school context, and greater buy-in from school staff (Bartelink et al., 2022). Similar frameworks emerged worldwide with different terminology, including Comprehensive School Health in Canada and *École en santé* (Healthy School) in Québec (see 2.1.3) (Désy, 2009).

Since the 1990s, repeated calls have been made by the WHO to make every school a health-promoting school via cooperation across all sectors of society, especially education and health (World Health Organization, 2017). In 1990, the European Network of Health Promoting Schools (now known as Schools for Health in Europe (SHE)) was set up conjointly by the Council of

Europe, the World Health Organization and WHO Europe to support member countries in creating school environments conducive to health (Désy, 2009; Rasmussen & Rivett, 2000; Stewart Burgher et al., 1999). In 1995, the WHO created the Global School Health Initiative to promote the HPS approach and encourage its implementation in countries worldwide (Désy, 2009; Tang et al., 2009). In 2005, WHO Europe published a strategy for child and adolescent health and development in which they reiterated the importance of schools as one of the central sectors which can improve the health of young people (World Health Organization, 2005). Globally, the WHO issued a call to action to “improve and maintain the health of the world's one billion adolescents” in 2014 and for cooperation among all sectors of society, and especially education in 2017 (World Health Organization, 2014, 2017). Despite repeated calls, school-based health promotion is still not fully implemented everywhere and there is generally much room for improvement to reap its full benefits.

### ***2.1.3 Theoretical frameworks for school-based health promotion***

The Health Promoting Schools (HPS) framework was developed to establish a holistic view of health, give students the knowledge and skills that enable them to make healthy choices, provide a healthy physical and social environment for all members of the school community, empower students to take action for a healthier life, and become active change agents in their environment (Bada et al., 2019; Barnekow et al., 2006). A Cochrane systematic review identified three key principles of HPS across a variety of definitions and models in the literature:

1. Formal health curriculum: specific time should be allocated within the formal school curriculum for HPIs to help students develop the knowledge, attitudes, and skills needed to make healthy choices;

2. School environment: the school social and physical environment should support the well-being of students through an informal curriculum, values and attitudes;
3. Engagement with families and communities: in recognition of the importance of other spheres of influence on children's health, attitudes and behaviours, schools should cultivate links with families and the wider community (Bada et al., 2019; Deschesnes et al., 2003; Langford et al., 2014).

In parallel with Europe, school-based health promotion developed in North America and Australia, although with a different history and terminology. However, similar frameworks emerged in these different jurisdictions. In the United States, health promotion and education were initially provided mostly with a curriculum-based approach (St Leger et al., 2007), but was broadened and redefined as Comprehensive School Health Education or Coordinated School Health by the Centers for Disease Control (CDC) (Allensworth & Kolbe, 1987). In Canada, Comprehensive School Health (CSH) is defined by the pan-Canadian Joint Consortium for School Health (JCSH) as “an internationally recognized framework for supporting improvements in students' educational outcomes while addressing school health in a planned, integrated and holistic way”. It comprises four inter-related pillars:

1. Teaching and learning: resources and activities should be provided through the curriculum to help students build skills to improve their health and wellbeing;
2. Social and physical environments: the quality of infrastructures and school amenities as well as quality of relationships among and between staff and students should support student emotional well-being and healthy lifestyle habits;

3. Healthy school policy: school processes, practices, procedures and policies should shape a respectful, welcoming and caring school environment and promote health and wellbeing;
4. Partnerships and services: connections with families, schools and other community organizations should link different sectors to provide services and advance student health and wellbeing (Pan-Canadian Joint Consortium for School Health, n.d.; Veugelers & Schwartz, 2010).

In Québec, drawing from the JCSH, CDC and WHO frameworks (Roberge & Choinière, 2009), the approach was only concretely framed in 2003 through an official intersectoral agreement between the provincial ministries of health and education (Désy, 2009; Ministère de l'Éducation, du Loisir et du Sport, 2014). The purpose of this agreement was for stakeholders and managers in the health and education networks to adopt a common vision of the needs of students and their families and the actions to be undertaken in response to those needs (Ministère de l'Éducation, du Loisir et du Sport, 2014). The agreement endorses the “École en santé”, or Healthy School (HS), approach (Ministère de l'Éducation, du Loisir et du Sport, 2013). The HS approach aims to intervene in a global (i.e., by acting on key individual and environmental factors) and concerted manner (i.e., collaboratively with school staff, parents and the wider community) in health promotion and prevention (Martin & Arcand, 2005). This can take the form of a set of actions deployed in a coherent and collaborative manner by the various school actors and partners who are concerned about the educational success, health and well-being of young people (Martin & Arcand, 2005).

In short, HPS (WHO), CSH (Canada) and HS (Québec) all represent comprehensive approaches to health promotion in the school setting that aim to improve the health of young people and their educational success (Simard & Deschesnes, 2011). Although there are differences in terminology and conceptualization, the three key principles related to the health curriculum, the school environment, and the links with families and community remain constant (Simard & Deschesnes, 2011). These approaches represent an international consensus on the potential for health promotion through the school and the influence of the school environment on the health of young people, parents and staff.

Despite repeated calls for worldwide uptake, these whole-school approaches have not been systematically implemented in every school. Although much more established in Europe, this approach has only gradually been adopted in Canada and elsewhere (e.g., Australia) (Désy, 2009). In Québec, evaluation of the implementation of the Healthy School approach showed that HPIs are often implemented as “one-time” activities and not as part of an integrated whole-school programming (Tessier et al., 2017). In the next sub-section, I summarize the breadth of evidence on HPI evaluation.

#### ***2.1.4 What is the evidence on the effectiveness of school-based health promotion?***

First, some significant challenges are worthy of note for the evaluation of school-based HPIs. Many interventions are not evaluated (Fung et al., 2012; Jepson et al., 2006). Among those that are evaluated, challenges related to the complex nature of schools and interventions have often led to mixed results. Evaluation of school-based HPIs is often done by assessing one specific intervention within a school, or an intervention addressing a specific theme (e.g. physical activity)

that has been implemented in many schools. Methodological challenges include ethical and feasibility issues with study designs traditionally considered as the gold standard for evaluation, such as randomized controlled trials (RCTs) ([Hawe et al., 2004](#); [Lister-Sharp et al., 1999](#); [Minary et al., 2019](#)). In schools, the implementation context is a determinant of intervention effectiveness. It can be difficult to find control groups on the basis of all important variables that could influence the outcomes of an intervention, given the complexity of school communities, hampering comparative experimental studies ([Hawe et al., 2004](#); [Minary et al., 2019](#); [St Leger et al., 2007](#)). Further, depriving control schools of potentially beneficial innovative HPIs raises ethical issues ([St Leger et al., 2007](#)). Other designs have been suggested, such as cluster RCTs, natural experiments or quasi-experimental studies ([Minary et al., 2019](#)), but these are costly and difficult to conduct in real-life conditions ([Lister-Sharp et al., 1999](#)). Given the multifactorial nature of chronic diseases ([Braveman et al., 2011](#)), the long-term time frame in which intervention effects on health across the lifecourse can be expected to manifest ([Lynch & Smith, 2005](#)), and the complexity of interventions themselves (i.e., many actors and moving parts) ([Hawe et al., 2004](#)), it can be difficult to establish the causal relationship between interventions and effects ([Braveman et al., 2011](#); [Minary et al., 2019](#)). As opposed to evidence-based decision-making for clinical interventions (e.g., surgery, medication) which is well established and focuses mainly on outcomes, evidence-based decision-making in population health, while more difficult to achieve, should also focus on implementation processes ([Braveman et al., 2011](#); [Lister-Sharp et al., 1999](#); [Minary et al., 2019](#); [St Leger et al., 2007](#); [Veugelers & Schwartz, 2010](#)). Despite these challenges, some interventions have been more thoroughly evaluated in the literature and are indicative of the positive potential of school-based HPIs. These are described next.



At the turn of the 21<sup>st</sup> century, Lister-Sharp et al. (1999) conducted a review of reviews on school-based health promotion which included 32 systematic reviews of 591 studies evaluating HPIs in elementary and high schools. Overall, they concluded that some improvements could be consistently achieved by HPIs, including health-related knowledge, physical fitness, intention to use substances (i.e., tobacco, alcohol, drugs), some health protecting behaviours (e.g., use of bike helmets), developing/fostering skills for resistance/refusal (e.g., ability to say no to negative influences) and abuse prevention, and changes in the environment (e.g., provision of healthy meals at school) (Lister-Sharp et al., 1999). However, they concluded that improvements in psychological health, dietary intake, cholesterol levels and delaying smoking initiation were only sometimes achievable, and improvements in attitudes towards substance use, reductions in weight, as well as reduction of risky behaviours (e.g., substance use, high-risk sexual behaviour) were rarely or not achievable (Lister-Sharp et al., 1999). The authors also systematically reviewed evidence on the effectiveness of the HPS approach, but were limited in terms of number of studies (n = 12) and weaknesses in study designs. A more recent review was conducted by Langford et al. with a much larger number of studies (n = 67) and which focused specifically on interventions aligning with the three components of the HPS framework (i.e., school curriculum, school environment, engagement with families and/or community) In this Cochrane systematic review, the authors found positive effects for some HPIs in terms of body mass index, physical activity, physical fitness, fruit and vegetable intake, tobacco use, and reductions in bullying (Langford et al., 2014). Intervention effects were generally small and the evidence did not permit establishing effectiveness for alcohol and drug use, sexual health, violence, or mental health. They concluded that there is potential for significant benefits from HPIs and the holistic HPS approach, but that

further research is needed with different designs, measures, process evaluation, and long-term post-intervention follow-up evaluation ([Langford et al., 2014](#)).

Robustness of the evidence also varies by health issues targeted by the HPI. Systematic reviews have shown evidence for benefits of physical activity HPIs in terms of improved fitness, increased physical activity during school hours ([Dobbins et al., 2013](#); [Kriemler et al., 2011](#); [Sluijs et al., 2007](#)), body mass index ([Dabravolskaj et al., 2020](#)), motor performance, self-concept, knowledge of and attitudes towards physical activity ([Demetriou & Honer, 2012](#)), and time spent watching television ([Dobbins et al., 2013](#)). An umbrella review of systematic reviews shows that school-based nutrition interventions focusing on education and/or changes in the school environment may have positive effects on student fruit and vegetable intake ([O'Brien et al., 2021](#)). Some smoking prevention interventions have effectively reduced student initiation ([Thomas et al., 2013](#)). However, HPI effectiveness for smoking prevention may vary depending on appropriateness of programme elements for different developmental stages (i.e., childhood, early, middle and late adolescence) ([Onrust et al., 2016](#)), as well as duration, type, content and mode of delivery of the intervention ([Carney et al., 2016](#)). Oral health interventions consisting of in-class screening and referral to dental care resulted in little conclusive evidence for student benefits ([Arora et al., 2019](#)), but interactive interventions such as in-class supervised fluoride rinsing or toothbrushing were effective in reducing the prevalence of dental caries ([Levin et al., 2009](#)). For mental health promotion, effective interventions have been shown to be using a social and emotional learning approach (i.e., designed for the acquisition of knowledge, attitudes and skills to understand and manage emotions, set and achieve positive goals, develop and maintain positive relationships, evaluate the opinions of others, and make responsible decisions) ([Clarke, 2019](#)). Systematic

reviews have shown positive results on student outcomes including improvements in self-efficacy, internalizing behaviors, frequency of use of coping skills ([Fenwick-Smith et al., 2018](#)), social-emotional skill development, positive social behaviors, and reduced emotional distress ([Taylor et al., 2017](#); [Wells et al., 2003](#)).

Another relevant way to evaluate HPIs and provide compelling evidence for decision-makers is to frame the issue and its possible solutions in economic terms. However, cost-benefit and cost-effectiveness studies on school-based HPIs are scant ([Cauwenberghe et al., 2010](#)), primarily because the diversity of practices in the dynamics of the teacher-student, student-student engagements makes it methodologically complex to design such studies ([St Leger et al., 2007](#)). Some authors have looked into this topic however. In a micro-simulation model building on a meta-analysis of 80 studies on three types of school-based health promotion (i.e., comprehensive school health interventions, multicomponent HPIs, and modifications to the physical education curriculum), the authors calculated that each dollar invested in comprehensive school health interventions would avoid 8.24\$ in future direct healthcare costs for the treatment and management of chronic diseases (824% return on investment) ([Ekwaru et al., 2021](#)). Multicomponent HPIs implemented outside of a whole-school approach could also attain a return on investment of 465% ([Ekwaru et al., 2021](#)). In the Cochrane systematic review ([Langford et al., 2014](#)), only two included interventions had data on cost-effectiveness. The first, the “Ulm Research on Metabolism, Exercise and Lifestyle Intervention in Children” pilot-tested with second-grade elementary school students, showed an incremental cost-effectiveness relation of 11.11 EUR per cm waist circumference growth prevented and 18.55 EUR per unit of waist-to-height ratio gain prevented ([Kesztyüs et al., 2013](#)). The second, “Safer Choices”, intended to prevent HIV, STDs and pregnancy among high

school students, showed a return on investment of 2.65 USD in medical and social costs saved for every USD dollar invested (Wang et al., 2000). This is encouraging evidence for the potential of school-based HPIs to reduce the chronic disease burden on society in the long-term.

Additionally, positive effects of HPIs on academic outcomes have been documented (Murray et al., 2007; Pucher et al., 2013; Symons et al., 1997), although more research is warranted to build this body of evidence. It is often said that healthier students are better learners (Powney et al., 2000; St Leger et al., 2010), which is hypothesized as indirect effects through improvements in autonomy and self-esteem (Veugelers & Schwartz, 2010). Evaluation of some mental health HPIs has shown positive results for proficiency in reading and mathematics and reduced absenteeism (Schonfeld et al., 2015; Snyder et al., 2010), as well as teacher-rated improvements in students' schoolwork (Dix et al., 2012). Canadian children with healthier diets were reportedly 30% less likely to fail their provincial achievement tests (World Health Organization, 2003). Academic performance was also not affected by a decrease in classroom learning in favor of an increase in physical education (Veugelers & Schwartz, 2010). Conditions for academic success and positive health of children and adolescents are probably largely the same. These co-benefits of HPIs are important to document and can be strong motivators to convince the education sector of the importance of implementing such interventions in schools (St Leger et al., 2007), thereby helping improve intersectoral collaboration. Building on the evidence in favor of positive outcomes of school-based HPIs, I describe next what factors are known to contribute to or hinder the effectiveness of HPIs.

### ***2.1.5 Facilitators and barriers for implementation and effectiveness***

Implementation of an intervention in a school context is complex and challenging. Among other changes, school staff must take ownership of new material, change their pre-established practices, and rearrange their schedule, (Poland et al., 2009). These are known challenges in intersectoral partnerships (Bilodeau et al., 2018). School-based health promotion requires collaboration between the health and education sector, but differences in language, perceptions, goals and priorities can make it challenging to unite towards a common goal (Young et al., 2012). School staff already have full agendas to deal with, and they may feel pressured by the expectations placed on them to also deliver health promotion (St Leger et al., 2007) which can lead to stress, work overload and frustration (Gugglberger et al., 2017). Schools cannot be perceived merely as a convenient setting in which to impose externally-designed health promoting interventions as is (St Leger & Nutbeam, 2000). Factors contributing to the success of HPIs must be studied at the school and community level as well as at the intervention level itself.

Among the factors that have been identified in the literature as associated with effective HPIs, factors related to implementation processes include leadership of school administrators (Darlington et al., 2018; Storey et al., 2016), dedicated champions to engage the rest of the staff (Storey et al., 2016; Tessier et al., 2017), teacher support for the intervention, and staff turnover (Forman et al., 2009). HPIs implemented as part of a whole-school approach (i.e., incorporating changes to the environment of the school) have been found more likely to be effective than stand-alone HPIs (Deschesnes et al., 2003; Lister-Sharp et al., 1999). Lastly, alignment of the intervention with the school philosophy, goals, policies and other programs has been identified as a key facilitator in multiple studies (Deschesnes et al., 2013; Domitrovich et al., 2008; Forman et

al., 2009; McIsaac et al., 2017). For example, a review of 38 different school-based violence prevention program was conducted to investigate contextual effects on program outcomes (Ozer, 2006). Contextual factors identified in the review included school culture (i.e., quality of relationships, structures of authority and decision-making), existing norms regarding aggression in the school, classroom climate (i.e., organization, participation, quality of relationships between teacher and students, level of trust among students), school readiness for change, and school history of previous attempts to implement violence prevention interventions (Ozer, 2006). School culture consistently emerges as an important factor for successful implementation and potentiated benefits of school-based HPIs. This echoes the importance ascribed to whole-school approaches by the different theoretical frameworks and approaches. This thesis focuses on school culture in the context of HPI delivery. In the next section, I will define the concept of school culture and describe how it is related to school-based HPIs.

## **2.2 School culture**

### ***2.2.1 Defining health-promoting school culture***

Implementation scientists are increasingly concerned with studying interactions between interventions and their context (Cambon et al., 2019; May et al., 2016; Minary et al., 2019). Based on a concept analysis across extant literature, Pfadenhauer et al. (2015) define context as “a set of characteristics and circumstances that consist of active and unique factors that surround the implementation effort. As such context is not simply a backdrop for implementation, but it interacts, influences, modifies and facilitates or constrains the intervention and the implementation effort” (Pfadenhauer et al., 2015). With this framing, interventions can be understood as events occurring within a broader system with which they are in constant interaction (Craig et al., 2018;

Hawe et al., 2009; Shiell et al., 2008). This represents a shift from earlier conceptualizations that contextual confounders need to be eliminated, when in fact they are part of normal conditions of practice and should be taken into account (May et al., 2016). Reflective of this evolution, the Medical Research Council and National Institute for Health Research in the United Kingdom recently updated their Framework for Developing and Evaluating Complex Interventions to incorporate greater attention on interactions between context and interventions (Skivington et al., 2021). These considerations apply to complex interventions in all types of settings, including schools.

Indeed, the context in which school-based HPIs are implemented is key for the delivery and success of these interventions. School culture, part of the school context, is defined as the way a school functions and the values, norms, beliefs and behaviours shared between staff, students and the school community (Domitrovich et al., 2008; Scheerens, 2000). It includes the range of social, cultural, physical, pedagogical and political elements that positively influence health and educational success (Arcand et al., 2013). A supportive school culture denotes what is expected, supported, and rewarded within the school, and has been identified as a facilitator for the implementation of health-promoting interventions (Debowski, 2008; Domitrovich et al., 2008; Fair et al., 2018; Forman et al., 2009; Lyon et al., 2018; McIsaac et al., 2017). Multiple terms and definitions are used in the literature to refer to school culture including school ethos, school climate, and organizational culture (Domitrovich et al., 2008; MacNeil et al., 2009). While some authors even consider school culture to be a component of school climate, others see school climate as a level of school culture (Aldridge & Ala'I, 2013; Demanet & Van Houtte, 2019). In the HPS and other frameworks, consideration of a school's specific culture is evident in the categorisation

of the whole school approach as including school environment and links with the community (Langford et al., 2014). Although there is no clear consensual definition of this concept, a growing body of literature indicates that increased understanding of how the school context can facilitate health promotion is crucial to help schools implement well-adapted, effective health-promoting interventions to their students. To this end, we define “health-promoting school culture” in this thesis as encompassing the school values, expectations, and policies that influence implementation of health-promoting interventions. The next sub-section describes the theoretical foundations that underpin existing research on this topic.

### ***2.2.2 Theoretical foundations***

Beyond schools specifically, organizational culture has been studied as a characteristic of intervention context in multiple fields. In the healthcare management literature, although it also lacks a universally accepted definition for this concept, a growing number of studies have investigated changes in culture as a key element of large system transformation (Willis et al., 2016). Schein's Model of Organizational Culture, introduced in the 1980s, conceptualizes organizational culture in three levels: (1) the surface level consists of tangible representations of culture known as artifacts (i.e., visible organizational structures, processes, tangible materials, and observable actions); (2) the second level consists of supported beliefs, values, norms strategies and rules; and (3) the deeper level consists of underlying, often unconscious assumptions and beliefs which influence and guide the perceptions and behaviours of individuals in the organization (Schein, 2004; Willis et al., 2016). Numerous theories, frameworks, models and taxonomies in implementation science integrate dimensions of context and culture to analyse determinants of implementation (Nilsen & Bernhardsson, 2019). Although common dimensions can be identified,



there remains considerable variation in how organizational culture is defined and conceptualized. The same is true in the field of health promotion, as described next.

Theories of the impact of the school context on student health were initially developed in relation to student achievement and behaviour, centering on how schools engage students in learning and promote positive relationships between students and teachers ([Bonell et al., 2013](#); [MacNeil et al., 2009](#)). Subsequent theories were developed to explain how school culture influences student health, starting with Markham and Aveyard's theory of human functioning and school organization ([Markham & Aveyard, 2003](#)). According to this theory, instructional (i.e., how a school enables students to learn) and regulatory (i.e., how a school promotes norms of behavior and belonging) "orders" are meant to enable students to develop abilities to understand and manage their feelings, make healthy choices, and form positive relationships with others ([Markham & Aveyard, 2003](#)). In schools where these two orders are well established (i.e., termed "value-added education" by the authors), students would be more likely to learn and follow the health-promoting values promoted by the school ([Bisset et al., 2007](#)). Markham and Aveyard also hypothesized that both the students' social background and the school's culture could influence the way students respond to school teachings ([Aveyard et al., 2004](#)).

Other authors drew on organizational culture literature, such as Rickwood who suggested a theorization of school culture in three levels: (1) artifacts which are external representations of the school's health-promoting values (e.g., physical environment, such as the condition of physical activity facilities and the state of the gym equipment); (2) school policies and practices which

permit identification of school strategies, goals and philosophies; and (3) underlying assumptions and beliefs of school actors with regard to health promotion programming (Rickwood, 2015).

A recent systematic review of the influence of school environments on student health identified 24 theories from 37 reports, including Markham & Aveyard's theory of human functioning (Bonell et al., 2013). The theories were synthesized into an integrated theory of school environment influences on students operating through four pathways: (1) student commitment to the school and its staff; (2) student commitment to their peers at school (and whether these peers are themselves committed to school); (3) student cognition and learning; and (4) student behaviours (Bonell et al., 2013). Although few of these theories of change describe the interaction between school culture and intervention implementation and effectiveness, they provide useful theoretical explanations of how health-promoting school culture could influence school values facilitating HPI programming.

### ***2.3.3 Measurement***

Just as multiple terms and definitions are used to refer to school culture in the literature, multiple scales and measurement tools have been used to study it. School culture is a latent variable, defined by MacCallum & Austin as a construct that cannot be directly measured (Bollen, 2002; MacCallum & Austin, 2000). Measures based on observed variables in a given sample can be used to approximate the latent variable. For these measures to be useful they must on one hand be reliable (i.e., measuring precisely and with certainty), and on the other hand be valid (i.e., effectively represent that which is proposed to be measured) (Dassa, 2019; Streiner & Norman, 2003). These psychometric properties can be measured as reliability coefficients such as Cronbach's alpha which can inform researchers on the internal consistency of a scale or instrument (Tavakol &

Dennick, 2011); validity can be evaluated differently depending on the type of validity that is sought/targeted (e.g., construct validity, content validity, criterion validity) (Streiner & Norman, 2003). These are important to evaluate when developing instruments for latent variables such as school culture.

School culture has been measured from the perspective of staff (Hart et al., 2000; MacNeil et al., 2009; Penney et al., 2018; Pretorius & Villiers, 2009; Uline & Tschannen-Moran, 2008) and students (Aldridge & Ala'I, 2013; Aveyard et al., 2004; Loukas et al., 2006; Markham et al., 2012; Zullig et al., 2010). Examples of recurrent and validated tools include the Organizational Health Inventory, which consists of ten dimensions (reliability coefficients ranging from 0.72 to 0.95), not specific to health-promoting school culture but covering communication, cohesiveness, morale, innovativeness, and problem-solving in the school (MacNeil et al., 2009). The Organisational Climate Description (OCDQ-RE) consists of six dimensions (Cronbach's alpha ranging from 0.78 to 0.94) including principal behavior (i.e., supportive, directive, restrictive) and teacher behavior (i.e., collegial, intimate, disengaged) (Hoy et al., 1991; Pretorius & Villiers, 2009). The "What's Happening in This School" questionnaire was developed in six dimensions to assess student views on teacher support, peer connectedness, school connectedness, affirmation of diversity, rule clarity, and ease for reporting and seeking help (Aldridge & Ala'I, 2013). The authors evaluated its reliability (Cronbach's alpha ranging from 0.89 to 0.93) and different types of validity (i.e., convergent, discriminant, concurrent, predictive) (Aldridge & Ala'I, 2013). Common domains to these measurement tools include connectedness, communication, a safe environment where rules are clear and the ability to use resources. The role of the school principal for collegial leadership was also underscored in terms of creating an open climate and helping to

secure resources for the school and staff ([MacNeil et al., 2009](#); [Pretorius & Villiers, 2009](#)). Most of the tools presented in this paragraph come from the education field and were not developed to capture dimensions of school culture that could relate to student health and health-promoting school culture. Tools designed specifically for that purpose would likely be more appropriate to measure how school culture can facilitate HPI implementation and how HPIs can modify health-promoting school culture.

Studies designed to specifically measure school culture in relation to student health have often used a variety of school-level variables. To operationalize their theory of human functioning and school organisation, Markham and Aveyard attempted to capture value-added education (i.e., the extent to which the school provides adequate support and control to relay both an instructional and regulatory order to students) ([Aveyard et al., 2004](#)). Student-level variables were used as proxy measures of the two orders: the instructional order which aims to transmit knowledge and skills to students was measured by school achievement (i.e., the proportion of students attaining passing grades in a standardized GCSE exam at age 16); the regulatory order which aims to transmit values and codes of conduct was measured through “truancy” (i.e., the number of half days lost through unauthorized student absences) ([Aveyard et al., 2004](#)). However, concerns were later raised about this early development of the school culture measurement as being too crude, and that any associations found would be subject to confounding and not provide direct evidence of the influence of school culture on student behaviors ([Jamal et al., 2013](#)). Other school-level variables listed in a systematic review of studies on the effect of school environment on student health ([Bonell et al., 2013](#)) can be summarized in four categories: school physical environment (e.g., playground and school building area per student, neglected or attractive physical environment),

school policies (e.g., existence of a smoking policy, smoking ban, alcohol use permitted at school on special occasions), school social environment (e.g., student smoking monitored regularly at/around school, total number of unobservable and unsupervised places in and around school, penalties for smoking, level of sanctioning if caught using alcohol at school), and school characteristics (e.g., public vs. private school, academic level of students in the school). Although this systematic review provides an important portrait of how school context and student health have been studied in the literature, validity and reliability were given little consideration – no reliability coefficients were reported.

Other scales developed to evaluate the HPS approach also include relevant domains, although not always explicitly designed to measure school culture. For example, the Health Promoting School Ethos Measurement Tool was developed to measure school ethos as an aspect of school context that could help us understand the link between HPIs and improvements in student health and well-being (Penney et al., 2018). It consists of eight dimensions including school esthetics, sense of belonging, safe surroundings, availability and accessibility of school features for health promotion, material resources of the school, consciousness of health, and reinforcement of health in the school (Cronbach's alpha ranging from 0.60 to 0.87) (Penney et al., 2018). This is one of few measurement tools that were developed from theory-based literature and with a specific focus on school culture. Other measurement tools which were developed to evaluate the HPS approach include the scale for Health Promoting Schools (SHPS). This was developed for use in Korean elementary, middle and high schools, and included seven latent factors established by exploratory and confirmatory factor analysis. Cronbach's alpha for the seven factors ranged from 0.86 to 0.91 (Lee et al., 2014). Other Health Promoting School scales were developed but were not grounded

in a theoretical framework ([Pinto et al., 2016](#)) or were not assessed for validity or reliability ([Lemerle, 2005](#); [Yoshimura et al., 2009](#)). Other scales measure similar concepts based on different frameworks such as the Whole School, Whole Community, Whole Child framework ([Koriakin et al., 2020](#)), or focus on specific components such as school connectedness ([Chung-Do et al., 2015](#)).

Overall, there is little agreement on how to measure the various dimensions of school culture ([Hoy et al., 1991](#); [Hoy & Tarter, 1992](#)), and a wide variety of school culture measurement tools and surveys exist ([Cohen et al., 2009](#); [Lucarelli et al., 2014](#)). These are not always assessed for validity or reliability. A systematic review of school health assessment tools identified only seven of 649 studies on health-promoting schools that assessed the psychometric properties of the scales used ([Kazemitabar et al., 2020](#)). Despite the importance of theoretically grounded research in this field ([Aveyard et al., 2004](#)), few studies explicitly link measurement to theoretical models ([Bonell et al., 2013](#)). There is therefore a need for theoretically grounded, reliable and valid measures of health-promoting school culture to build evidence useful for HPI implementation.

### **2.3 What do we know about social inequalities in school-based health promotion?**

As discussed in Chapter 1, early life intervention is crucial to narrow health inequalities and reduce the burden of chronic diseases ([Bloom et al., 2012](#); [Braveman & Barclay, 2009](#); [Walker et al., 2011](#)) and schools are an ideal setting for the delivery of public health interventions that can reach all children who attend school, regardless of socioeconomic status. To specifically address health inequalities, health promoting interventions are particularly needed in schools serving children who live in disadvantaged neighborhoods, where they are exposed to high levels of poverty, unemployment, and a disproportionately high prevalence of chronic diseases due to limited

opportunities for healthy living ([Galobardes et al., 2006](#); [Paquet et al., 2014](#); [Thielman et al., 2016](#); [Walker et al., 2011](#)). Universal delivery of school-based health promotion is intended to help all children, but this populational health approach has been criticized for not necessarily benefitting those who need it the most ([Frohlich & Potvin, 2008](#)). Hypotheses like the inverse care law suggest that access to quality health care is often inversely proportional to the needs of the target population ([Hart, 1971](#)). If applied to school-based health promotion, such a hypothesis is indicative of the risk that disadvantaged students may be less exposed to these programs. Challenges for disadvantaged schools (i.e., schools serving a majority of students from disadvantaged backgrounds) have been identified in the educational and public health literature, including competing priorities, low student participation, low parental involvement, limited resources (e.g., material, human, financial), staff instability and turnover ([Basch, 2011](#); [Domitrovich et al., 2008](#); [Gaudet & Breton, 2009](#); [Thrupp & Lupton, 2006](#)). Heavier student health and social needs in schools serving disadvantaged youth ([Moore & Littlecott, 2015](#)) may lead to a heavier staff workload, challenging classroom management and creating continuous confrontation with urgent problems ([Archambault et al., 2014](#); [Gaudet & Breton, 2009](#); [Thrupp & Lupton, 2006](#)). This could leave little time for staff to devote to health promotion programming. Inequalities in the delivery of HPs to students who need it most could exacerbate already existing health inequalities during childhood and adolescence. In this section, I will describe the current state of evidence on the influence of social inequalities on health promotion programming and health-promoting school culture.

### ***2.3.1 Evidence on social inequalities in availability, implementation and effects of HPIs***

Although some interventions have been designed and evaluated to target disadvantaged students, overall evaluation of the reach or impact of HPIs across the social gradient is limited. Despite increasing calls for such evidence, few systematic reviews have taken on an equity lens or evaluated differential impact of interventions on health inequalities ([Kavanagh et al., 2009](#); [Welch et al., 2012](#)). In the Cochrane systematic review of the effectiveness of the HPS approach on the health and well-being of students, only half of the 67 included studies reported measures of student SES, and only two studies reported intervention effects on student outcomes by SES ([Langford et al., 2014](#)). In a systematic review of school-based HPIs conducted by Moore et al (2015), only 20 of 98 studies reported analyses of differential effects by SE and such analyses were more common in European studies than in North American studies ([Moore et al., 2015](#)). Targeting mental health promotion more specifically, Kavanagh et al. (2008) conducted a systematic review of school-based interventions for group-level cognitive behavioural therapy. Of 17 RCTs, none reported subgroup analyses based on participant SES. Another systematic review conducted by Love et al (2017) on physical activity interventions for school-age children (including interventions delivered outside of schools) found similar gaps (i.e., 60 of 98 intervention studies reported SES data; only 7 reported sub-group analyses). Compared to other settings (e.g., community, home, healthcare), school-based interventions included in this review were more likely to have been evaluated in subgroup analyses by gender, but sub-group or interaction analyses by SES were rare ([Love et al., 2017](#)). All authors of these reviews called for increased consideration of social inequalities in health promotion programming, and not assuming that interventions reach and are effective across SES.



In terms of inequalities in the effectiveness of school-based HPIs according to student SES, differential effects may be evaluated among students of the same group (i.e., in the same school, students from disadvantaged background demonstrating fewer benefits from the HPI than their advantaged counterparts), or evaluated at the school-level (i.e., intervention effects found to be greater in schools serving students from advantaged background than schools serving students from disadvantaged backgrounds) (Oldroyd et al., 2008). Some studies show no difference, others a positive or negative social gradient (De Bourdeaudhuij et al., 2011; Moore et al., 2015). However, these conclusions are limited by the lack of studies and poor quality (e.g., little justification for choice and validity of SES measure, failure to report test statistics) (Moore et al., 2015). Still, potential trends such as these warrant attention. Differential effects could be explained by the fact that vulnerable groups may be exposed to higher levels of stressful conditions and adversity, requiring more or different interventions than students from more advantaged groups (Kavanagh et al., 2009). Results of the review by Moore et al may also indicate that interventions based solely on education and incorporating little or no structural changes may be more likely to widen inequalities (Moore et al., 2015), as posited by other authors (Hofmann et al., 2014; McLaren et al., 2010; Whitehead, 2007). Challenges in implementation of HPIs could also affect effectiveness. Process evaluation of a Danish school-based fruit and vegetable intervention showed that schools serving a higher proportion of disadvantaged students were less likely to have high fidelity and consistency of implementation (Aarestrup et al., 2015). In Québec, process evaluation of 8 school-based mental health promotion interventions showed that disadvantaged schools may face challenges to implement interventions with fidelity, and that it may take more time before benefits manifest (Gaudet & Breton, 2009).

Even more rare are studies investigating whether universal health promotion programming reaches all schools. Two studies were identified in which authors investigated availability of interventions across a sample of schools. Stiefel et al (2017) collected data on nutrition and physical education interventions offered in 1463 New York City schools. They found little evidence of social inequalities in the availability of at least one intervention, but availability of comprehensive interventions and a high number of interventions were less likely in schools with a higher percentage of disadvantaged students (Stiefel et al., 2017). Differences in availability by neighborhood (i.e., schools located in Queens vs. Manhattan) were also evident. The other study focused more specifically on physical activity HPIs, namely active breaks (i.e., the classroom teacher either pauses instruction to take a brief activity break) and active lessons (i.e., the classroom teacher delivers instruction in a manner that incorporates movement directly into the lessons) (Turner & Chaloupka, 2017). In a nationally representative sample of 640 U.S. public elementary schools, they found that the use of active lessons was associated with student body ethnicity (i.e., teachers in majority-Latino schools were half as likely to offer active lessons than in predominantly-White schools) and the use of active breaks was associated with student body SES (i.e., use of physical activity breaks was half as likely in schools serving a majority of disadvantaged students) (Turner & Chaloupka, 2016). Considering these two studies and in the absence of a more substantial body of evidence, a major knowledge gap remains on inequalities in the availability of HPIs.

### ***2.3.2 Evidence on social inequalities in health-promoting school culture***

Lack of understanding of social inequalities in health-promoting school culture is also a major gap in the literature. Some authors have focused on school culture as measured by the quality of

relationships in the school and on how it may be influenced by student composition in the school (Bonell et al., 2016; Moore et al., 2017). On the one hand, dynamics of stigmatisation, exclusion and alienation may affect teacher and peer relationships among disadvantaged or racialized students (Carter, 2013; Fletcher & Bonell, 2013). Indeed, compared to students in advantaged schools, students in disadvantaged schools reported higher behavioral disengagement (i.e., a coping style reflecting students' tendency to reduce their efforts in school (Thuen & Bru, 2004)), which may be explained by a lower perception of social support from teachers (Brault et al., 2019; Demagnet & Van Houtte, 2019). However, Brault et al (2019) also investigated teacher culture (i.e., shared teacher beliefs of students' learning capabilities) and found that it could mitigate the negative association between school deprivation and student misconduct. By contrast, teacher culture in advantaged schools did not have the same moderation effect on student misconduct (Brault et al., 2019).

In another study, Moore et al (2017) found that disadvantaged students were less likely to report positive relationships with teachers and peers, and less likely to feel like they were involved in school-decision making (Moore et al., 2017). On the other hand, the interaction between school and student-level deprivation suggested that student-teacher relationships were better rated by disadvantaged students when they attended a school serving a majority of disadvantaged students (Moore et al., 2017). It may be that for disadvantaged students, alienation and marginalization have worse effects on their relationships especially when they attend a more advantaged school where they are the minority (Fletcher & Bonell, 2013). Others also hypothesize that teachers in disadvantaged schools may be aware of the additional challenges and adversity facing

disadvantaged students, leading them to put greater emphasis on emotionally supportive relationships with students and care for their other social needs (Lupton, 2005).

As highlighted by Thrupp & Lupton (2006), much of the research on school context and school processes has been conducted using qualitative study designs. Although this has provided plausible findings on social inequalities in this realm, larger scale quantitative studies are needed to further study school context in relation to student body composition and school neighborhood (Thrupp & Lupton, 2006). Much of this work has also been limited to an educational perspective. In the next paragraphs, I will summarize some findings that relate more specifically to health outcomes and health inequalities.

Markham & Aveyard's theory of human functioning and school organization was conceptualized in their study of inter-school variation in smoking, drinking and drug use prevalence that could not be explained solely by the composition of the student body (Markham & Aveyard, 2003). They posited that variations were likely due to unmeasured school contextual or collective factors (Aveyard et al., 2005; Bisset et al., 2007; West et al., 2004) and reported that among schools serving disadvantaged students, those with a culture providing more effective support and boundaries had a lower smoking prevalence among students (Aveyard et al., 2004). Conversely, another study reported that among schools serving advantaged students, those where school culture (measured as quality of staff and student relationships) was rated more poorly had a higher smoking prevalence among male students (Henderson et al., 2008). De Clercq et al (2014) also studied staff and student relationships in the form of school social capital (i.e., overall cohesion between pupils and teachers at school, and teachers' opportunity to interact with pupils and to

control their behavior directly). They did not find any interactions between socioeconomic disadvantage and social capital variables, although there was a significant negative association between school social capital and student smoking (De Clercq et al., 2014). They called for further research on the association of different forms of school social capital with smoking and social inequalities in smoking.

Outside of relationships among school actors, other dimensions of health-promoting school culture are beginning to attract focus in the literature. Moore et al investigated school commitment to health by assessing the extent to which schools prioritized students' emotional or physical health compared to academic outcomes. They found that higher levels of organisational commitment to health was associated with reduced within-school social inequalities in student smoking and wellbeing outcomes, and that school commitment to health did not vary by school deprivation (Moore et al., 2017). A number of other school culture elements associated with successful improvements in health promotion programming were identified in a qualitative study of barriers to promotion of healthy eating in eight disadvantaged Michigan schools (Lucarelli et al., 2014). Even though they faced the well-known challenges specific to disadvantaged schools, successful schools (i.e., with the highest number of nutrition accomplishments including improvements to school meals, improvements to school environment, application to outside grants to support nutrition initiatives, delivery of nutrition education or other HPIs) had a coordinated school health team that had been meeting on a regular basis for several years, higher awareness of health-related policies, high enforcement of health-rated policies, strong support from school administrators for promotion of healthy eating, nutrition champions and good teamwork among staff members (Lucarelli et al., 2014). These elements align with conceptualizations of school culture in

educational research, and Lucarelli et al suggest that the development of a health-specific model of school culture would be useful for the study of school-based health promotion.

The limited evidence available suggests that school culture could be associated with school deprivation in the context of health promotion, but further research is needed on whether health-promoting school culture varies by school deprivation and whether school culture can be modified to facilitate HPI delivery and improve student health outcomes. In the final section of this chapter, I will outline the knowledge gaps and limitations of this body of literature to lead to the objectives of this thesis.

## **2.4 Summary**

A central theme of this chapter is that school-based HPIs are a promising avenue for early prevention of chronic diseases. Social inequalities in the distribution of diseases and risk factors is well-established and therefore the delivery of effective HPIs for children growing up in disadvantaged conditions is critical in terms of addressing social inequalities in health. However, there is a widespread tendency in the literature to bypass social inequalities in this realm, which means that the extant evidence provides little insight into the actual or potential role of schools in creating, perpetuating or mitigating health inequalities (Moore et al., 2017). Although a targeted approach which favors implementing interventions specifically in disadvantaged schools may be effective in reducing the gap between disadvantaged students and their more advantaged counterparts (Vander Ploeg et al., 2014), the universal approach to school-based health promotion (i.e., which is how many public health programs have been deployed in schools, including in Québec (Ministère de l'Éducation, du Loisir et du Sport, 2013)) has not yet been studied

comprehensively in relation to social inequalities. There is thus an important knowledge gap on how schools serving advantaged and disadvantaged students compare in terms of the level and quality of health promoting interventions that are offered to their students.

A key factor of interest in the study of HPI implementation and effectiveness is school culture, but school culture has rarely been studied with an equity lens. Markham and Aveyard have already signaled that school culture may be less favourable for child health in disadvantaged schools, but that it could also be leveraged to change student behaviours and reduce health inequalities (Aveyard et al., 2004). However, few authors have undertaken research to address these notions, although Moore et al. also called for more research in other countries to investigate school culture and the level of health services and activities provided in schools (Moore et al., 2017). Many studies on contextual influences on school processes are qualitative, and the findings must be substantiated with evidence from larger scale quantitative studies (Thrupp & Lupton, 2006). Additionally, there is a lack of consensus on the conceptualization and measurement of health-promoting school culture, which hinders evidence-building in this field. Although numerous frameworks and measurement tools for school culture have been used in the educational field in relation to academic outcomes, Lucarelli et al (2014) emphasize that a health-specific model of school culture is an imperative for the field to guide school health practitioners and researchers. Such a model could help improve the effectiveness of HPis and contribute to maximizing benefits for early prevention of chronic disease and reduction of health inequalities.

In short, studies are needed on whether social inequalities exist in the availability of HPIs; whether school culture is linked to school deprivation; and how school culture is related to health promotion programming, especially in schools serving disadvantaged students.



## **CHAPTER 3. OBJECTIVES**

The general objective of this dissertation was to investigate the associations among school deprivation, school culture and HPI availability in elementary schools in Québec, Canada.

Specifically, the thesis objectives and sub-objectives were:

1. To quantify the association between school deprivation and each of perceived importance of health issues and HPI availability in schools.
2. To quantify the association between school deprivation and health-promoting school culture. To do so, we first developed theoretically grounded and reliable measures of health-promoting school culture.

Finally, because results from objective 1 showed a social gradient in the availability of mental health HPIs, our final objectives were:

3. To quantify the association between school context variables and mental health HPI availability.
4. To characterize mental health HPIs that had been implemented in study schools according to best practices for effective school-based mental health promotion.

## **CHAPTER 4. METHODS**

This chapter summarizes the methods used in the three empirical articles that compose this thesis. I discuss the PromeSS data set, briefly present recruitment and data collection procedures, and outline my role in the PromeSS study.

## **4.1 Source of data: The PromeSS Study**

### ***4.1.1 Study design***

To investigate the thesis objectives, we drew data from the PromeSS study, a cross-sectional study of elementary schools in Québec conducted in 2017-19. The overall goal of PromeSS was to investigate social inequalities in school-based health-promoting programming. Specific objectives were to determine if, in Québec elementary and high schools, there were social inequalities in: (1) the presence and/or types of HPIs, (2) the process of adopting HPIs, (3) the process of adapting of HPIs, (4) the barriers and facilitators to implementing HPIs, (5) the sustainment or process of achieving sustainment of HPIs, and (6) the process of scaling up HPIs at the school board level. The project was housed at the Centre de recherche du Centre hospitalier de l'Université de Montréal (CRCHUM). It received pilot funding from the Canadian Cancer Society in 2017 to develop the objectives and questionnaires and to initiate data collection in Montréal, Canada. Additional funding was received from the Québec Ministry of Health to expand the sampling frame to the entire province of Québec.

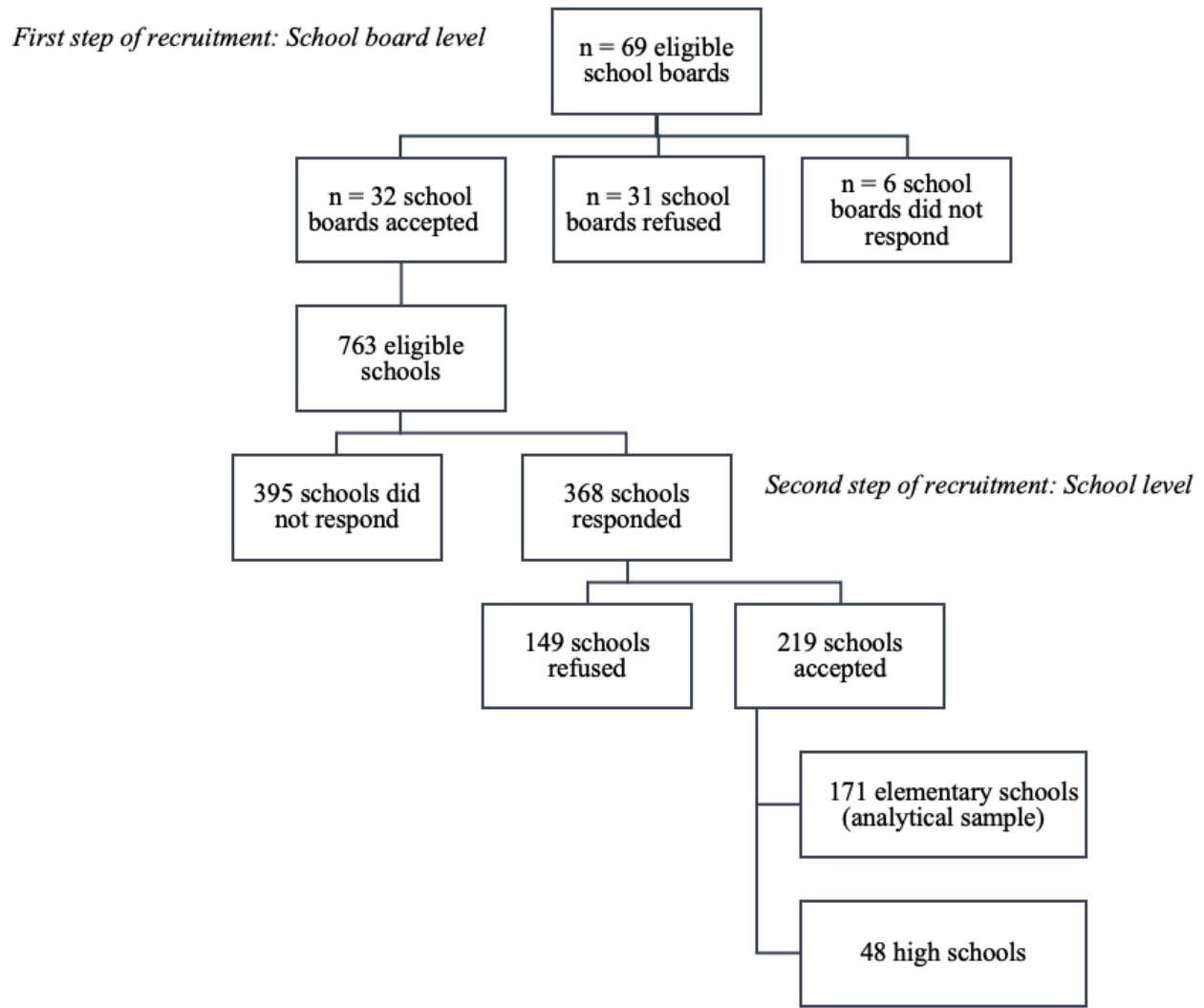
### ***4.1.2 Sample***

The sampling frame for Project PromeSS included all 1807 elementary schools and 469 high schools from all 69 public school boards in the province of Québec. At the time of the study, elementary and secondary public schools in Québec were grouped within school boards according

to geographic location and language (i.e., French, English). Private schools were excluded due to differences in funding and functioning compared to public schools. School recruitment occurred over a 30-month period beginning in March 2017 and ending in August 2019, and followed a three-step procedure (see Recruitment Flowchart in Figure 1):

- (i) School board approval was solicited. Processes to obtain school board approval varied by school board (e.g., formal review of the proposal by committee, presentation to the school board, telephone conversation with school board representative). In total, 32 of the 69 school boards (46%) accepted to participate and allowed recruitment of school principals;
- (ii) The second step comprised recruiting school principals and was undertaken by PromeSS research assistants in a 5-step standardised process incorporating mail, email, telephone contacts, and reminders. If there was no response after the 5th step, the school was considered “not recruited”. A total of 368 of the 764 eligible schools (48%) were contacted; 171 of 291 eligible elementary schools (59%) and 48 of 77 eligible high schools (62%) accepted to participate and completed the interview.
- (iii) School boards were selected for qualitative data collection through purposive sampling among the 32 school boards that consented to participate in the PromeSS study. A total of 17 school boards were contacted. All agreed to participate, and all completed the qualitative interview with a senior researcher with extensive experience in qualitative data collection.

Figure 1. School board and school recruitment flowchart

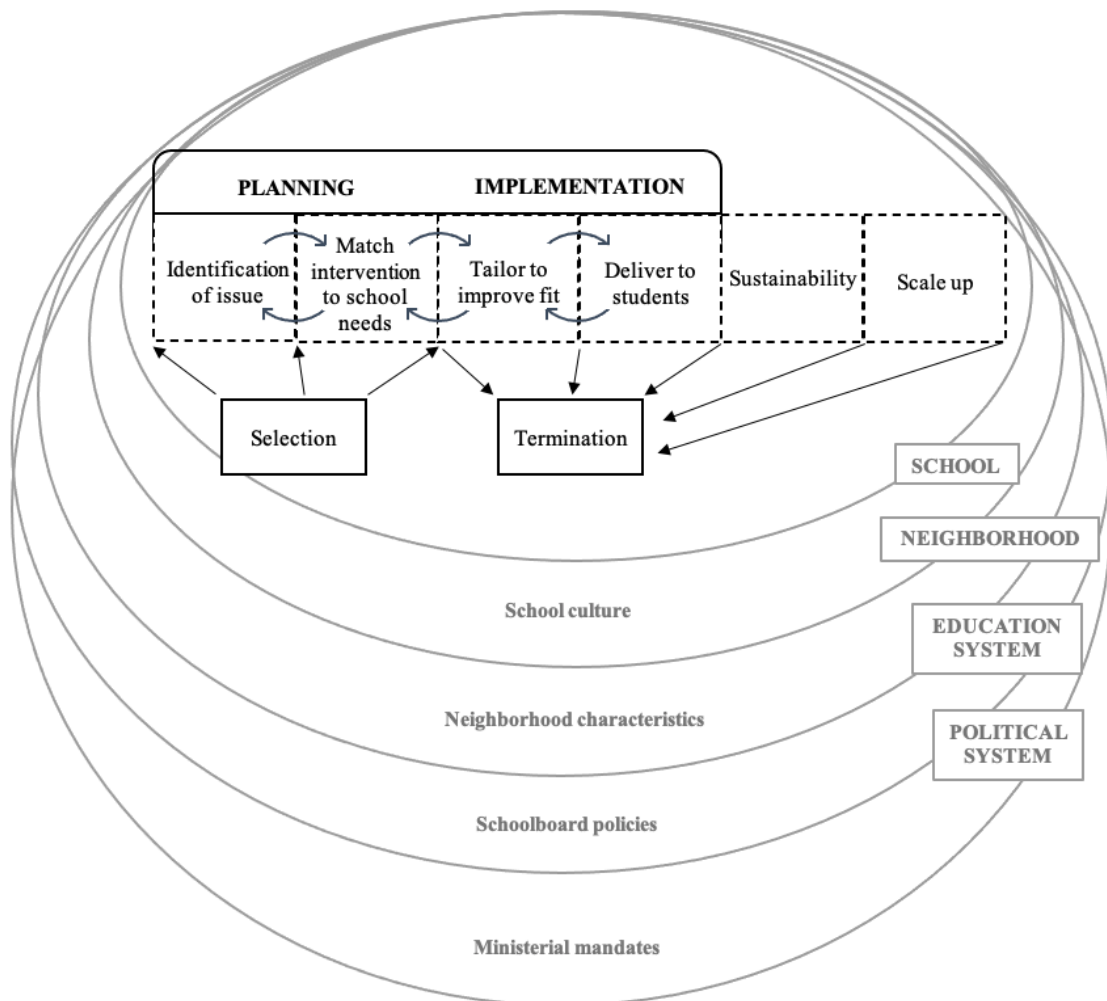


#### 4.1.3 Data collection

Data were collected in structured telephone interviews with school informants, which were administered by trained interviewers in French or English. Each school principal was asked to select one key informant (i.e., him/herself or a nominated staff member familiar with the processes of planning and implementing HPIs in the school) who had worked in the school for at least 6 months. School informants received a copy of the questionnaire prior to the interview, to allow for preparation including consultation with colleagues. Recruitment and data collection occurred over

the course of three school years (2016-17, 2017-18, 2018-19). PromeSS was guided by the PromeSS conceptual model (Riglea et al., 2022) based on the Theory of Diffusion (Rogers, 1983), which we enhanced using socio-ecological theory (Bronfenbrenner, 1979) (Figure 2). Questionnaire items were drawn/adapted from questionnaires used in previous work (O’Loughlin et al., 1998, 2015) or developed de novo using the peer-reviewed and grey literatures.

Figure 2. PromeSS conceptual model based on Roger’s Diffusion of Innovations Theory and Bronfenbrenner’s socio-ecological theory



The questionnaire (and telephone interviews to administer the questionnaires) was structured in two parts lasting approximately one hour in total. The first questionnaire collected general information on school context, student demographics, and the HPIs and extracurricular activities offered in the school during the past year. Informants were then asked to select one “specific HPI” that fit the following eligibility criteria: (i) not specifically mandated by the Ministry; (ii) delivered in the previous three years during class time to a group of students (i.e., interventions targeting individual students were not eligible); (iii) no cost to the students; and (iv) student participation was mandatory. They then responded to questions about that specific HPI. These questions were developed with reference to the planning phase depicted in the PromeSS conceptual model, and included identification of the HPI developers, number of years that the HPI had been available in the school, and school and intervention characteristics that were considered important when selecting or developing an HPI.

The second questionnaire was designed to collect data on the implementation phase of the specific HPI, including changes made prior to and during implementation, partnerships established with community organizations and other partners, evaluation methods, and projected sustainment of the HPI. The PromeSS questionnaires are available in English in [Appendix A](#).

Finally, qualitative data were collected at the schoolboard level (n=17) in semi-structured telephone interviews with key informants. The guide for this interview included questions on schoolboard processes for HPI sustainment and scale-up.



For this thesis, we restricted our sample to elementary schools, given that high schools differ markedly in context, school culture, student needs and methods of HPI delivery. The data used were drawn from the two-part questionnaire administered in schools. The qualitative data collected at the schoolboard level are outside the scope of this thesis and are not referred to hereafter in this thesis.

#### ***4.1.4 My role in the PromeSS study***

I was centrally involved in data collection and processing for Project PromeSS. More specifically, I conducted structured telephone interviews with school informants and undertook data entry. In this dissertation, I chose to focus on elementary schools only and went beyond the original PromeSS Protocol (see [Appendix B](#)) to develop my own research objectives pertaining to school deprivation, school culture, and the availability of HPIs.

#### **4.2 Variables**

Study variables are described in each of the three articles that comprise the results chapter of this dissertation. [Appendix C](#) contains detailed descriptions of each variable and [Appendix D](#) includes a table describing each variable in-depth including the name of the variable, the items used in the questionnaire to collect data on the variable, the response choices, re-coding of the response choices for analysis, the psychometric properties of the variable if relevant, and any references if relevant.

### **4.3 Statistical analyses**

We first inspected the variables in our database and checked for missing values to assess whether imputation was needed. We checked for incorrect or inadmissible codes and recoded variables for clarity where necessary. We examined the distribution and assumptions of normality for each variable and computed descriptive statistics (e.g., mean, standard deviation, median, interquartile range, proportions). Subsequent statistical analyses are described in each of the three papers as well as in [Appendix E](#).

### **4.4 Ethical Approval**

The PromeSS study protocol (CE 12.307) was approved by the Centre hospitalier de l'Université de Montréal (CHUM) Ethics Review Committee. The CHUM certificate of ethics approval was submitted to all eligible schoolboards and schools upon request. The PromeSS study followed strict ethical guidelines, in that informed consent was obtained verbally from school informants before they completed the questionnaire and data were anonymized before being uploaded to CHUM web servers. Ethical approval for this doctoral research (CERSES-21-056-R) was obtained from the Comité d'Éthique à la Recherche en Sciences et en Santé de l'Université de Montréal (CERSES). The ethics certificates required to complete the thesis are presented in [Appendix F](#).

## **CHAPTER 5. RESULTS**

This chapter includes the three articles that comprise the main body of this dissertation – two are published in peer-reviewed journals and the third is in preparation to be submitted. The articles are presented in the following order:

ARTICLE 1: Riglea, T., Kalubi, J. (co-first authors), Sylvestre, M. P., Maximova, K., Dutczak, H., Gariépy, G., & O’Loughlin, J. (2022). Social inequalities in availability of health-promoting interventions in Québec elementary schools. *Health Promotion International*, 1-11. <https://doi.org/10.1093/heapro/daab023>

ARTICLE 2: Kalubi, J., Riglea, T., O’Loughlin, E., Potvin, L., & O’Loughlin, J. (2023). Health-promoting school culture: How do we measure it and does it vary by school neighborhood deprivation? *Journal of School Health*. <https://doi.org/10.1111/josh.13304>

ARTICLE 3: Kalubi, J., O’Loughlin, J., Riglea, T., Doré, I., & Potvin, L. Mental health-promoting interventions in elementary schools: school context correlates of availability and alignment with evidence-based practices. Under review at *Journal of School Psychology*.

In addition to the three thesis articles, I am a leading author on two additional publications that use data from the PromeSS study. Although not central to this dissertation, they illustrate the quantity and quality of my work as a PhD candidate and provide additional support for the pertinence of the study of social inequalities and health-promoting school culture in the field of school health promotion. They are presented in [Appendix G](#) and [Appendix H](#) in the following order:

ARTICLE 4: O'Loughlin, E., Kalubi, J. (co-first authors), Ringlea, T., Pelekanakis, A., & O'Loughlin, J. (2022). Correlates of perceived success of health-promoting interventions in elementary schools. *Health Promotion and Chronic Disease Prevention in Canada*, 42(9), 398-407. <https://doi.org/10.24095/hpcdp.42.9.03>

ARTICLE 5: Kalubi, J., Ringlea, T., Wellman, B., O'Loughlin, J., & Maximova, K. Availability of health-promoting interventions in high schools in Québec, Canada by level of school deprivation. Accepted for publication in *Health Promotion and Chronic Disease Prevention in Canada*.

One other article stemming from our work with PromeSS data is in preparation and is not included in the appendices: Kalubi, J., Ringlea, T. (co-first authors), Wellman, R., O'Loughlin, E., Pelekanakis, A., Maximova, K., & O'Loughlin, J. School- and program-related factors associated with institutionalization of school-based health promotion interventions in Canada. In preparation for submission in *Implementation Science*.

## 5.1 ARTICLE 1. Social inequalities in availability of health-promoting interventions in Québec elementary schools

Published in *Health Promotion International* in 2021

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**AUTHORS' CONTRIBUTIONS.** JK and TR conceptualized the analytic plan, contributed to data collection and cleaning the database, conducted statistical analyses, interpreted the results, and wrote, reviewed and revised the manuscript. All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

**FUNDING.** JK held a Doctoral Scholarship from the Québec Order of Nurses (Ordre des infirmières et infirmiers du Québec) during the writing of this project. JOL held a Canada Research Chair in the Early Determinants of Adult Chronic Disease from 2004-2021. MPS and GG are supported by salary award from the Fonds de recherche du Québec—Santé. The PromeSS study was supported by a grant from the Québec Ministry of Health and Social Services.

**WORD COUNT** = 6,365 including Abstract, Text, and References

**NUMBER OF TABLES** = 1

**NUMBER OF FIGURES** = 1

**NUMBER OF SUPPLEMENTARY TABLES AND FIGURES** = 10

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## **ABSTRACT**

Availability of health-promoting interventions (HPIs) may vary across schools serving students with different socioeconomic backgrounds. Our objectives were to describe social inequalities across elementary schools in: (i) level of importance that school principals attribute to 13 common health-related issues among students in their school; (ii) availability of HPIs within their school addressing eight health topics; and (iii) (mis)alignment between perceived importance and HPI availability. Data were collected in telephone interviews with school principals in a convenience sample of 171 elementary schools (59% of 291 schools contacted). Schools were categorized as serving very advantaged, moderately advantaged or disadvantaged students. Principals reported how important 13 health issues were among students in their schools and provided data on HPI availability for eight health issues, four of which required school action under government mandates. Higher proportions of principals in schools serving disadvantaged students (36% of all 171 schools) perceived most health issues as important. The mean number of HPIs in the past year was 12.0, 12.1 and 11.7 in schools serving very advantaged, moderately advantaged, and disadvantaged students, respectively. Only availability of mental health HPIs differed by school deprivation (60%, 43%, and 30% in very advantaged, moderately advantaged and disadvantaged schools, respectively). Although most schools offered oral health HPIs, dental problems were not perceived as important. Smoking was perceived as not important and smoking-related HPIs were relatively rare (9%). Given rapid evolution in public health priorities, (mis)alignment between perceived importance of specific health issues and HPI availability in elementary schools warrants ongoing reflection.

## **LAY SUMMARY**

Interventions that promote health may not be present in all schools. Our objectives were to describe differences across elementary schools in: (i) level of importance that school principals attribute to common health-related issues among students in their own school; (ii) the presence of interventions that address these health issues; and (iii) (mis)alignment between perceived importance and presence of interventions. Telephone interviews were conducted with school principals in 171 elementary schools serving very advantaged, moderately advantaged or disadvantaged students. Principals reported how important 13 health-related issues (four of which required school action under government mandates) were among students in their schools and whether interventions were present for eight of the 13 issues. Higher proportions of principals in schools serving disadvantaged students perceived most health issues as important. Intervention availability did not differ across schools, except that higher proportions of schools serving advantaged students reported mental health interventions. Most schools offered oral health interventions, but dental problems were not perceived as important. Smoking was also not perceived as important and interventions were relatively rare. (Mis)alignment between perceived importance of health issues and intervention availability calls for ongoing reflection.



## INTRODUCTION

The link between socioeconomic status (SES) and health is apparent early in life. Compared to more privileged families, children as young as five months in underprivileged families already exhibit poorer health and a higher risk of chronic issues (Paquet *et al.*, 2001). Poverty in childhood is also associated with lower developmental scores and a higher risk of multiple health problems (Bradley and Corwyn, 2002). Early life intervention is therefore crucial to narrow social inequalities in health, especially since the gap widens over time as genetic, environmental and social influences are compounded (Braveman and Barclay, 2009).

Schools are ideal settings for early health promotion since children, regardless of SES, spend many hours at school each day. Apart from the family, schools play a decisive role in child development (St Leger *et al.*, 2007) and school-based health-promoting interventions (HPIs) are key components of population-based strategies to foster the development of health promoting behaviors in children from an early age (Langford *et al.*, 2014). Because school-based HPIs reflect a critical potential to affect child health (Basch, 2011), government mandates are enacted in many jurisdictions to encourage schools to address important health-related issues. In Canada, the Québec government has implemented mandates that foster school-based health promotion in physical activity (Ministère de l'Éducation, du Loisir et du Sport, 2017), oral health (Ministère de la Santé et des Services sociaux, 2015), sex education (Ministère de l'Éducation et de l'Enseignement supérieur, 2018), and prevention of bullying (National Assembly of Quebec, 2012). However, Québec schools have considerable autonomy in selecting and implementing specific HPIs that address government mandates. For example, HPIs can be developed by school

staff or they can be adopted from and implemented by public or private entities exterior to the school (e.g., physical activity programs developed by a non-profit organization).

However, despite this potential, it is unclear whether children with different socioeconomic backgrounds receive similar exposure to HPIs at school. Inequalities in the quantity, content or mode of delivery of school-based HPIs may exacerbate already existing social inequalities in health. Although a large body of literature addresses facilitators and barriers to HPI implementation (St Leger, 1999; Pearson *et al.*, 2015; Bennett *et al.*, 2016; Dowling and Barry, 2020), few studies investigate whether social inequalities are present in HPI availability. Limited resources, low participation, the risk of student stigmatization (Basch, 2011) and competing priorities are known challenges for health promotion in schools serving disadvantaged communities. Compared to schools serving more advantaged communities, staff in schools serving disadvantaged communities may have heavier workloads because they are burdened with urgent day-to-day problems, higher levels of learning difficulties among students and challenging classroom management, leaving little time for health promotion programming (Archambault *et al.*, 2014). However, few studies that evaluate health promotion interventions in schools examine or discuss these issues. Although some authors highlight the potential for universally accessible school-based HPIs to narrow social inequalities in health, knowledge gaps on whether HPIs are equally available in schools serving students with differing SES backgrounds persist (Moore *et al.*, 2015).

Our objectives in this current study were to describe social inequalities in elementary schools in:  
(i) level of importance that school principals attribute to 13 common health-related issues among

students in their school; (ii) availability of HPIs within their school addressing eight health topics; and (iii) (mis)alignment between perceived importance and HPI availability.

### **Conceptual model**

Guided by Rogers' Diffusion of Innovations Theory (Rogers, 1983), the *PromeSS* study aims to describe social inequalities in four phases of school-based HPI delivery including planning, implementation, sustainability and scale-up (Figure S1). Planning involves identifying a need and matching the need with an appropriate intervention. During implementation, the intervention is delivered to students and may be adapted to the school context. If the intervention is not terminated and is viewed as successful, sustainability involves a plan to integrate the intervention into the school in a more permanent way. Finally, scale-up involves delivering the intervention to a wider segment of the student population or in other schools. Given the complexities of interventions and the school context, this process likely unfolds in a non-linear recursive fashion which is influenced by dynamic interactions between factors in the community and the educational and political systems (Willis *et al.*, 2016). This current study focuses on HPI availability within schools and does not address sustainability or scale-up.

### **METHODS**

*PromeSS* is a cross-sectional survey of school principals and/or a nominated staff member in a convenience sample of public schools in Québec. The sampling frame comprised all 1,795 elementary and 436 high schools in 69 school boards in Québec. We excluded private schools, special needs schools that only serve students with intellectual impairments or learning difficulties, and schools with fewer than 30 students (because they are not assigned a deprivation indicator).

School board approval was obtained from 32 of 69 eligible school boards (46%), and 594 elementary (i.e., 33% of all elementary schools in Québec) and 170 high schools (i.e., 39% of all high schools in Québec) within these 32 school boards were eligible for recruitment. Schools were mailed or emailed a letter of introduction advising them of an upcoming telephone contact by a research team member (i.e., a retired principal with >30 years of experience working in Québec's school system). One week later, the principal was contacted to confirm eligibility (i.e., that participants had worked in their current school longer than 6 months) and to solicit participation. If ineligible, the principal nominated a vice principal (n=7) or another staff member (n=5) to complete the interview. After verbal consent, a telephone interview was scheduled at a time convenient to the participant before, during or after school hours. A total of 368 of the 764 eligible schools (48%) were contacted; 171 of 291 eligible elementary schools (59%) and 48 of 77 eligible high schools (62%) accepted to participate and completed the interview. Figure S2 summarizes recruitment of school boards and schools. The analytical sample for this current study was restricted to elementary schools since high schools likely differ markedly in context, the array of health issues that are important in the adolescent student population and methods of HPI delivery.

Data on school and participant characteristics, perceived health issues and HPI availability were collected over three academic school years (2016-17, 2017-18, 2018-19) in two-part structured telephone interviews (median length = 52.0 minutes, including both parts) administered by trained interviewers in the language preferred by participants (English or French). Questionnaire items were developed *de novo* or drawn/adapted from questionnaires used in previous work (O'Loughlin *et al.*, 1998, 2015). English and French questionnaires were pilot tested by asking nine retired

principals to narrate their thought processes as they interpreted the questions and formulated responses.

Ethics approval was obtained from the Centre hospitalier de l'Université de Montréal (CHUM) Ethics Review Committee. The CHUM certificate of ethics approval was submitted to all eligible schoolboards and principals on request.

### **Study variables**

*Perceived importance of health issues* was measured in each grade cycle (i.e., Kindergarten; Grade 1-2; Grade 3-4; Grade 5-6), by: “In the past year, how important was each of the following health issues for your [grade cycle] students? ....” followed by a list of 13 health issues common among elementary school students. We chose the 13 issues based on a list of health themes identified as relevant to students by the Institut national de santé publique du Québec (INSPQ), a national center of expertise in public health (Tessier and Comeau, 2017). Themes included aggressive behavior; lack of physical activity; unhealthy eating; inadequate sleep; problems with mental health (asked only for students in grades 5-6); dental problems; lack of respect for safety; infections, viruses, parasites; attention deficit hyperactivity disorder (ADHD); problems with personal hygiene; bullying (asked only for students in grades 3-6); cigarette smoking (asked only for students in grades 3-6); concerns about puberty (asked only for students in grades 5-6). The list was refined (i.e. for wording and relevance of issues by grade cycle) in collaboration with a retired school principal and then pilot-tested in a small group of school principals. Participants were instructed by the interviewers to indicate the level of importance of each health issue as it pertained to their own school context, taking into consideration whether the issue warranted special attention or

intervention by school staff. Response options ranging from extremely to not at all important were recoded for analysis as important (extremely important, very important, important) or not important (not very, not at all). Table S1 describes responses on perceived importance of specific health issues by grade prior to recoding.

Health-promoting interventions (HPIs) were defined as activities complementary to the educational curriculum offered to all students during class time at no cost, for which student attendance is mandatory. Table S2 lists examples of HPIs for selected health issues. *HPI availability* was measured by: “In the past year, has your school offered any health-promoting interventions, in which participation is expected at the group, class, grade, or school-level to address...?”, followed by a list of eight health topics (i.e., physical activity/active living; sex education; healthy eating; bullying and exclusion; personal safety and injury prevention; mental health and well-being; oral health; tobacco control). Response options were yes or no. The list of HPI topics was developed independently from the list of health-related issues for the perceived importance questions, but there was overlap for eight of the 13 health issues.

School characteristics included *language of instruction* (English; French); *school neighborhood* (urban, suburban, rural); *number of students* in the school; *number of students at risk* (i.e., with vulnerability factors such as physical disabilities, behavioral difficulties, social maladjustment or learning difficulties that might affect learning or behavior); *proportion of students at risk* (i.e., number of students at risk/total number of students); *number of full- and part-time teachers*; *teacher turnover* measured by: “In the past 3 years your school experienced...teacher turnover?” Responses were coded as high (several staff; some staff) or low (few staff, no turnover in past  $\geq 3$

years); and *principal turnover* measured by: “In the past 3 years your school experienced....principal turnover?”. Responses included high principal turnover ( $\geq 3$  in 3 years; 2 in 3 years), or low principal turnover (1 in 3 years, 0 in  $\geq 3$  years). Finally, all schools with  $\geq 30$  students in Québec are ranked according to the 2016-17 *school deprivation indicator* (Ministère de l'Éducation et de l'Enseignement supérieur, 2017), a composite score for each student reflecting whether the mother completed high school and whether both parents are employed full-time (Beauchesne, 2003). Scores range from 1 (lowest deprivation) to 10 (highest deprivation). Schools were grouped into three categories: schools serving very advantaged students (score 1-3), moderately advantaged students (4-7) or disadvantaged (8-10) students.

Participant characteristics included *sex, age, current position in the school, highest level of completed education, number of years of experience in current school, and number of years of experience in current position.*

Table S3 provides details on all study variables including questionnaire items used to obtain the data, response options and recoding of response options for analysis.

### **Data analysis**

To quantify differences across school deprivation levels, we estimated unadjusted relative risks and their 95% confidence intervals for perceived importance of health issues and for HPI availability across school deprivation level in Poisson regression models (Zou, 2004). (Mis)Alignment between perceived importance and HPI availability for eight health issues was

portrayed in bar charts. Analyses were performed using SPSS, Version 25.0 (Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.).

## **RESULTS**

Our sample of schools was similar to all eligible elementary schools in Québec (n=1795) in the distribution by the school deprivation indicator (21% vs. 24% very advantaged; 44% vs. 39% moderately advantaged; 36% vs. 38% disadvantaged) (Ministère de l'Éducation et de l'Enseignement supérieur, 2017); official language of the school board (83% vs. 90% French-speaking schools); and median number of students per school (267 vs. 259) (Table S4). One-quarter of study schools were located in urban neighborhoods, 36% were suburban, and 40% were rural. Principals reported French as the mother tongue of 98% of students in study schools. Finally, 42% of principals reported high teacher turnover and 22% reported high principal turnover.

Sixty-nine percent of participants were female and almost all (97%) were principals or vice-principals. Mean (SD) age was 47.3 (7.4) years (range 30-60 years). Participants had worked a mean (SD) of 3.4 (2.6) years (range 1-10) in their current school, and 7.1 (3.4) years in their current position (range 1-10).

### **Perceived importance of health issues**

Health-related issues perceived as important by  $\geq 60\%$  of all principals included attention deficit hyperactivity disorder (ADHD), aggressive behavior, mental health problems, inadequate sleep, lack of respect for safety, and bullying (Table 1). Relatively few principals viewed dental problems



(30%) or cigarette smoking (5%) as important health issues among students attending their schools.

Compared to principals in schools serving moderately or very advantaged students, higher proportions of principals in schools serving disadvantaged students perceived that aggressive behavior, inadequate sleep, lack of respect for safety, lack of physical activity, unhealthy eating, infections, personal hygiene and dental problems were important health issues (Table 1). On average they reported that 7.6 (SD 4.0) issues were important, compared to 6.5 (SD 3.7) in moderately advantaged schools and 5.5 (SD 3.5) in very advantaged schools. Table S5 supports that the relative risks for perceived importance of specific health issues differed across school deprivation for physical inactivity, unhealthy eating, infections, personal hygiene and dental problems.

Although generally higher proportions of principals in disadvantaged schools perceived many health issues as important, there was one exception – 57% of the 61 principals in disadvantaged schools viewed mental health as an important health issue compared to 68% of 75 principals and 71% of 35 principals in moderately and very advantaged schools, respectively.

Table 1. Proportion of participants who perceived specific health issues as important and proportion of participants reporting presence of specific health-promoting interventions, by school deprivation level, Project PromeSS, Québec, Canada, 2017-19.

	Total (n=171) %	School deprivation indicator <sup>a</sup>		
		Disadvantaged (n=61) %	Moderately advantaged (n=75) %	Very advantaged (n=35) %
<i>Health issue perceived as important</i>				
Attention deficit hyperactivity disorder	79	79	80	77
Aggressive behavior	68	74	69	57
Mental health problems <sup>b</sup>	65	57	68	71
Inadequate sleep	63	71	63	49
Lack of respect for safety	61	69	59	51
Bullying and exclusion <sup>b</sup>	60	64	59	57
Concerns about puberty <sup>b</sup>	54	57	52	54
Lack of physical activity	51	62 <sup>d</sup>	52 <sup>d</sup>	29 <sup>d</sup>
Unhealthy eating	51	69 <sup>d</sup>	51 <sup>d</sup>	23 <sup>d</sup>
Infections, viruses, parasites	46	56	39	43
Problems with personal hygiene <sup>b</sup>	36	51 <sup>d</sup>	31 <sup>d</sup>	20 <sup>d</sup>
Dental health problems	30	51 <sup>d</sup>	23 <sup>d</sup>	17 <sup>d</sup>
Cigarette smoking <sup>b</sup>	5	5	5	3
<i>Health-promoting intervention present</i>				
Dental health <sup>c</sup>	94	95	93	94
Bullying and exclusion <sup>c</sup>	90	89	91	91
Physical activity/active living <sup>c</sup>	89	87	89	91
Sex education <sup>c</sup>	85	90	81	83
Healthy eating	74	82	69	69
Personal safety and injury prevention	45	51	37	51
Mental health and well-being	42	30 <sup>d</sup>	43 <sup>d</sup>	60 <sup>d</sup>
Tobacco control	9	13	8	6

<sup>a</sup>All schools with at least 30 students across Québec are ranked according to a province-wide school deprivation indicator (IMSE), with scores ranging from 1 (highest SES) to 10 (lowest SES). Schools were grouped into three categories based on the IMSE score: schools serving very advantaged (IMSE 1-3), moderately advantaged (IMSE 4-7) or disadvantaged (IMSE 8-10) students.

<sup>b</sup>Participants provided data for specific grade levels (See details in Supplementary Table 1).

<sup>c</sup>Intervention or intervention topic is government-mandated (see details in Supplementary Table 5).

<sup>d</sup>p < 0.01.

## HPI availability

Elementary schools offered an average of 11.9 (8.4) HPIs in the past year, including 12.0 (7.6) in very advantaged schools, 12.1 (10.6) in moderately advantaged schools, and 11.7 (5.4) in disadvantaged schools. Table S2 describes examples of HPIs offered according to specific health

issues and suggests that HPIs cover a wide variety of health topics and are highly diverse in content, structure and mode of delivery.

More than 80% of elementary schools offered HPIs related to oral health, bullying, physical activity and sex education (Table 1), each of which is government mandated. Table S6 describes Québec government mandates in schools by health issue. Less than half of schools offered HPIs related to injury prevention (45%) or mental health (42%), and only 9% offered tobacco control HPIs.

HPI availability did not vary by school deprivation levels (Table 1; Table S7) with one exception – 60% of very advantaged schools offered mental health HPIs compared to 43% of moderately advantaged schools and only 30% of disadvantaged schools.

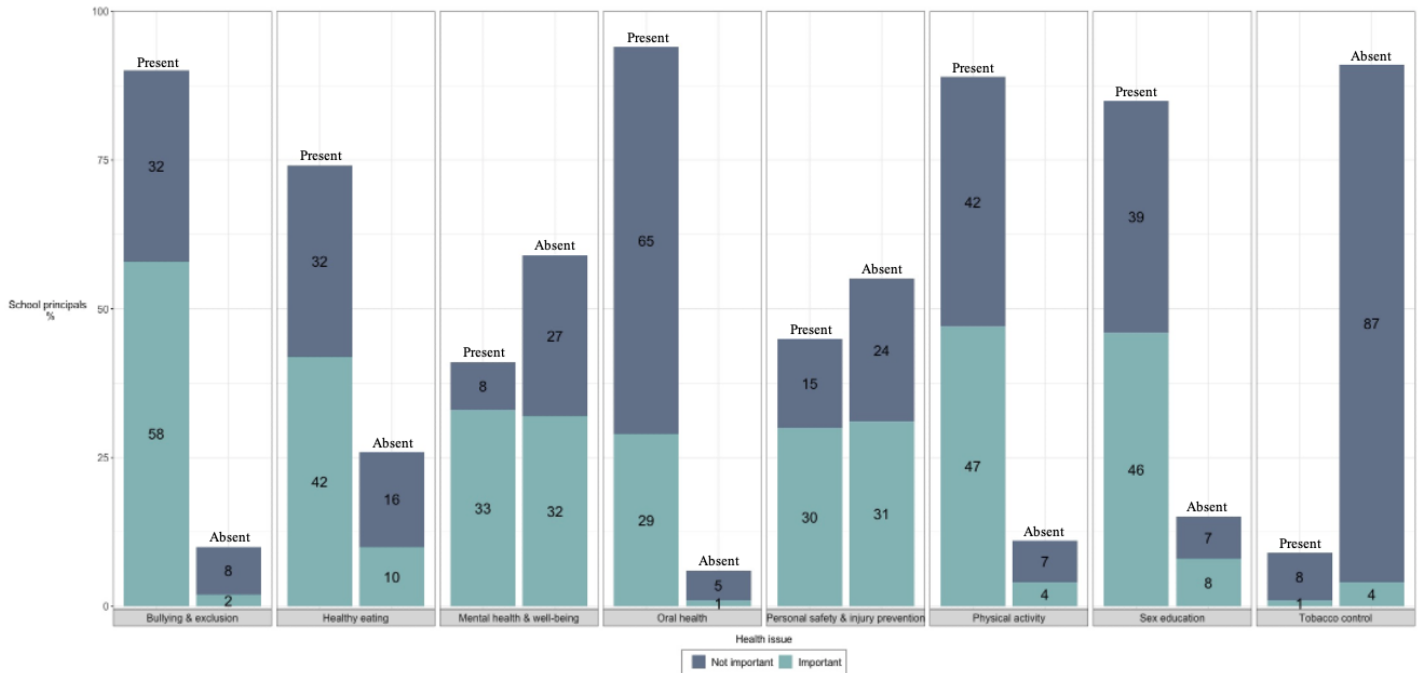
### **Alignment between HPI availability and perceived importance of health issue**

Figure 1 shows that HPI availability generally aligned with perceived importance of the health issue. However, suggestive of misalignment, oral health HPIs were available in 94% of schools but only 29% of principals in schools with oral health HPIs reported that dental problems were an important issue. In contrast, HPI availability and perceived importance were tightly aligned for tobacco control – 91% of principals reported no tobacco control HPIs in their school, and 87% of these principals regarded smoking as an unimportant issue.

No social gradients were observed in perceived importance of concerns about puberty, bullying and exclusion, personal safety and injury or cigarette smoking in schools with or without HPIs

addressing these issues. However, social gradients in perceived importance may exist in schools with HPIs for physical activity, healthy eating and oral health (Figure S3). For example, a similar proportion of schools offered physical activity HPIs regardless of deprivation. However, within these schools, the proportion of principals who reported that physical activity was important ranged from 29% in very advantaged schools to 57% in disadvantaged schools. In schools in which mental health HPIs were available, perceived importance of mental health issues ranged from 18% in disadvantaged schools to 51% in very advantaged schools.

Figure 1. Proportion of school principals by availability of health-promoting interventions (present, absent) and perceived importance of health issue (important, not important) according to specific health issue, Project PromeSS, Québec, Canada, 2017-19.



Bar charts for each health issue show the proportion of school principals who reported that an HPI addressing the issue was present or absent (in the left and right bars respectively), and within each bar the proportion of principals who perceived that the health issue was or was not important. Four possible combinations are displayed for each health issue: (i) HPI available and issue was perceived as important; (ii) HPI available but issue was not perceived as important; (iii) HPI absent but issue was perceived as important; (iv) HPI absent and issue was not perceived as important.

## **DISCUSSION**

In this study of Québec elementary schools, we aimed to describe social inequalities in perceived importance of common health issues among elementary school students, and in the availability of school-based HPIs to address these issues. The paragraphs below discuss key findings related to perceived importance, HPI availability and to the juxtaposition of perceived importance and HPI availability.

### **Perceived importance of common childhood health issues**

Issues related to non-physical well-being were endorsed as important by high proportions of principals. Notably, ADHD was identified as important regardless of school deprivation level, by 79% of principals. In Québec, the lifetime prevalence of ADHD is 11% between ages 1-24 years (Diallo, Rochette and Pelletier, 2019). In addition to its high prevalence, issues related to integrating special needs students in the classroom may underpin the perception that ADHD was one of the most important health-related issues. Teachers view children with ADHD as more disruptive in the classroom (Ohan *et al.*, 2008) and may find students with ADHD more stressful to teach than their classmates without ADHD.

Similarly, aggressive behavior, lack of respect for safety and bullying were endorsed as important by two-thirds of principals. A longitudinal study conducted in 2013-17 in 84 elementary schools in Québec (Beaumont, Leclerc and Frenette, 2018) affirmed how common these issues are, with students witnessing an average of one conflict, three incidents of students imposing their will on others, and one incident of vandalism per year. Further, 56% of students reported that they were victims of insults or threats, social or indirect aggressive events (i.e., being rejected, false rumors),

physical aggression (i.e., being hit), or material, electronic or indirect aggression (i.e., theft, breakage of personal objects) at least once during the school year (Beaumont, Leclerc and Frenette, 2018).

Despite widely available HPIs, there were social gradients in perceived importance of many health issues. If principal perceptions reflect reality, it may be that HPI content or quality varies across social groups, that HPIs have differential impacts across social groups (Moore *et al.*, 2015), or that HPIs are simply not sufficient in and of themselves to reduce social inequalities in health. Previous studies have raised concerns that school-based health promotion programs may be least effective among high-risk students (Vander Ploeg *et al.*, 2014), which could create new or exacerbate existing social inequalities (Frohlich and Potvin, 2008).

### **HPI availability**

Aligned with international consensus on the link between schools and health promotion (St Leger *et al.*, 2007), most schools in our sample, regardless of deprivation level, offered a wide variety of HPIs. As illustrated by the WHO Health Promoting School concept (Langford *et al.*, 2014) and the “Healthy School” approach in Québec (Martin and Arcand, 2005), there is generally strong support for school-wide health promotion, and there is good evidence of HPI effectiveness in these contexts, notably for physical activity, nutrition and bullying outcomes (Fung *et al.*, 2012; Langford *et al.*, 2014). Even prior to developing a provincial framework, Québec schools already offered many health promotion/education interventions (Roberge and Choinière, 2009), which could reflect widespread understanding by school staff of the well-established link between health and education outcomes. A recent qualitative study (Todd *et al.*, 2015) reported that principals

believe that schools have responsibility towards children's health but underscored that intervention availability is linked to perceived importance of the health issue by school staff.

Almost all principals reported that their schools offered HPIs pertaining to oral health, bullying and exclusion, physical activity and sex education, all of which are government mandated. As illustrated in our conceptual model (Figure S1), planning and implementation of an HPI occurs within a wider political system and can be heavily influenced by ministerial mandates. Although criticized for imposing HPIs that do not necessarily fit the school context (Darlington *et al.*, 2018), ministerial mandates are not necessarily overly prescriptive. For example, since 2012, all public and private educational facilities in Québec must adopt and implement activities to prevent bullying and violence in school facilities (National Assembly of Québec, 2012). The Québec mandate outlines nine elements that must be included in the plan (e.g., preventive measures, designating staff or parent facilitators, measures for confidentiality of victims, disciplinary actions) but is not prescriptive in how they should be implemented (National Assembly of Québec, 2012). In addition to mandates, our model posits that identification of an issue as important is a main driver of HPI availability. In addition to the HPIs imposed by government mandates (i.e., for physical activity, bullying and exclusion, dental health and sex education in Québec), schools likely adopt interventions according to school staff perceptions of the most important health issues challenging their student body. Overall, our data suggest that government mandates assure HPI availability across schools regardless of deprivation level, and therefore potentially contribute to reducing social inequalities in access.

### **Juxtaposing perceived importance and HPI availability**

*Mental health* – A worrisome finding in *PromeSS* was the social gradient observed in both perceived importance of mental health problems and mental health HPI availability. Relatively fewer principals in disadvantaged schools viewed mental health problems as an important issue, and fewer reported mental health HPIs in their schools. These findings run counter to the large body of literature demonstrating important social inequalities in child mental health (Kessler *et al.*, 2005). The low uptake of mental health HPIs in disadvantaged schools is particularly worrying given the importance of child mental health for healthy development and academic performance. Childhood is a critical period for the development of mental health and disorders, with half of all lifetime cases manifesting by age 14 (Kessler *et al.*, 2005). Schools may be natural venues for early mental health promotion but if mental health issues are indeed more prevalent in schools serving disadvantaged students then the social gradients observed herein need explanation and possibly intervention.

*Dental problems* – Vulnerable populations remain disproportionately affected by dental caries, gingivitis, tooth decay and tooth loss (Thomson, 2012), and the Québec National Public Health Program 2015-25 underscores the importance of school-based dental screening programs to reduce these inequalities. Our finding that 93% of elementary schools offer oral health HPIs reflects a government mandate that regional health centers provide dental hygienists to schools for screening and educational activities (Ministère de la Santé et des Services sociaux, 2015). However relatively few principals viewed dental problems as important and the disconnect between perceived importance and HPI availability was more notable in advantaged schools. There is evidence that such screening interventions may be more beneficial for children from more affluent backgrounds (Qadri *et al.*, 2018), for whom access to dental services represents a less important barrier.



However, our data cannot distinguish whether lower perceived importance of dental problems in advantaged schools reflects better dental health and easier access to dental services among more privileged children or more effective HPIs in more advantaged schools. Public health experts may need to reflect whether universal dental health school programs are relevant given the apparent misalignment between perceived importance and availability.

*Tobacco control* – Almost all principals reported that cigarette smoking was not an important health issue and few schools provided tobacco related HPIs. It is possible that because provincial legislation prohibits smoking on school grounds, principals do not consider smoking an important issue simply because it is not ostensibly visible. Although marked declines in cigarette smoking over the past two decades and lack of visibility may encourage a sense of complacency, 15% of grade 7-9 students in Québec had ever tried smoking a cigarette in 2017 compared to 9% across Canada – almost double the proportion (Reid *et al.*, 2019). Further, aggressive e-cigarette marketing targeted to youth (Mantey *et al.*, 2016), legalization of recreational cannabis and increasing availability of flavored tobacco products currently represent major threats to tobacco control (Feirman *et al.*, 2016). Since vulnerability to initiating tobacco (and other psychoactive substances) is established early in life (Wittchen *et al.*, 2008) and preventing or at least delaying first use is highly desirable (Khuder *et al.*, 1999), exclusion of HPIs related to tobacco use in elementary schools could represent a critical lost opportunity. It may be opportune to re-consider whether elementary schools should offer smoking related HPIs and whether they have the potential to influence well-established social inequalities in cigarette smoking.

## **Implications**

Our findings suggest that research is needed to ascertain the validity of school principal perceptions of the importance of a variety of health issues in their student population. If accurate, principals could provide sentinel information on important and emerging health issues, as well as issues that no longer warrant public health resources. HPI effectiveness across schools with differing deprivation levels also needs investigation, including reasons for differences in effectiveness. That HPIs may not reach all groups or have a universal effect is rarely assessed in HPI evaluation studies (Moore *et al.*, 2015). Beyond school-based health promotion, the assumption that universal interventions benefit all equally has been challenged, with the risk that those who are most vulnerable benefit the least (Frohlich and Potvin, 2008). Systematic reviews indicate that there is considerable variability in health programming, with some programs increasing and others reducing health inequalities (Lorenc *et al.*, 2013). Although an HPI implemented in disadvantaged schools improved student health to the level of students in more advantaged neighborhoods (Vander Ploeg *et al.*, 2014), few studies document the potential of HPIs to narrow gaps between children, and few studies analyze the social processes through which schools replicate or reduce inequalities (Moore *et al.*, 2017).

In addition to research, our findings may inform discussion among public health leaders related to ensuring development of policies that promote HPIs that align with current evidence-based need; enabling timely alignment of new HPIs with emerging health issues; and ensuring HPI availability that takes social inequalities into account. Overall, the aim is to assure efficient and equitable delivery of effective school-based HPIs that are sensitive to evidence-based need and respond in a timely way.

## **Limitations**

Limitations of this study include the cross-sectional design, the small sample size which limited precision and use of data reported by a single participant, which may not represent a viewpoint shared by all school staff. Responses from a single person within an organization may not provide an accurate portrayal of the organizational perspective. However, the *PromeSS* questionnaire was sent to participants in advance and they were encouraged to collect information from their staff in preparation for the interview. The possibility remains that responses from school principals reflect vested interests. Data collection from multiple respondents within the same school however was not feasible in this study. Previous studies have reported discrepancies between perceived and objectively measured health issues in children (Ra *et al.*, 2016). Finally, even though the distribution of study schools by deprivation level resembled that of all elementary schools provincially, use of a convenience sample may limit generalizability of the findings.

## **CONCLUSION**

Most elementary school children regardless of SES, have access to a wide variety of HPIs. HPI availability in elementary schools generally aligns with perceived importance of student health issues among principals, especially for HPIs that are government mandated. Possible exceptions include HPIs for mental health and dental health, which may require review by public health experts to assure that their availability aligns with evidence-based need. Social inequalities in mental health HPI availability and the lack of tobacco control HPIs may require immediate attention.

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**SUPPLEMENTARY MATERIAL**

Figure S1. Conceptual model based on Roger’s Diffusion of Innovations Theory, underpinning Project PromeSS, Québec, Canada, 2017-19.

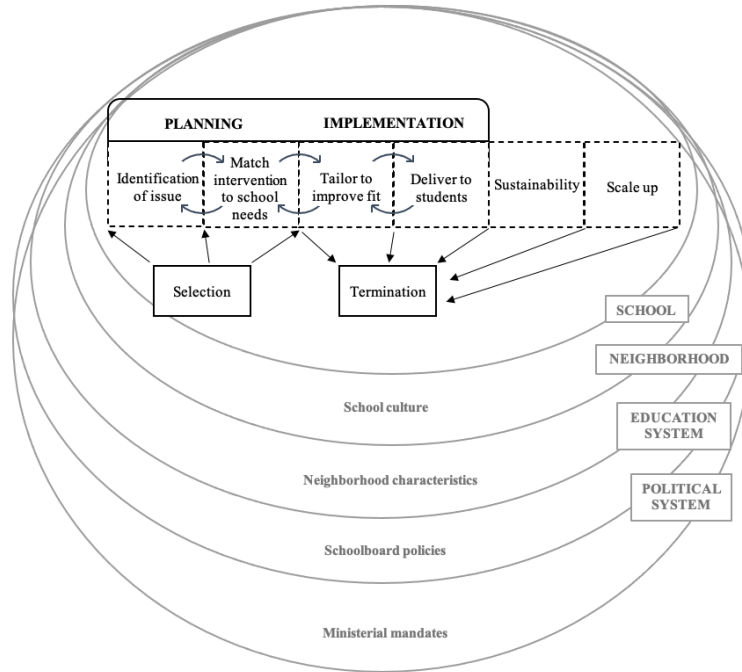


Figure S2. Flowchart of school board and school recruitment, Project PromeSS, Québec, Canada, 2017-19.

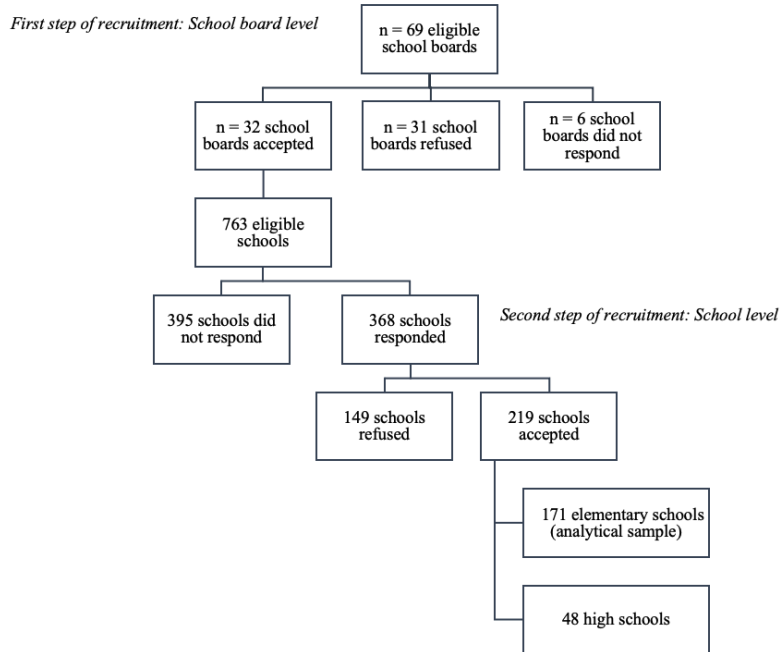
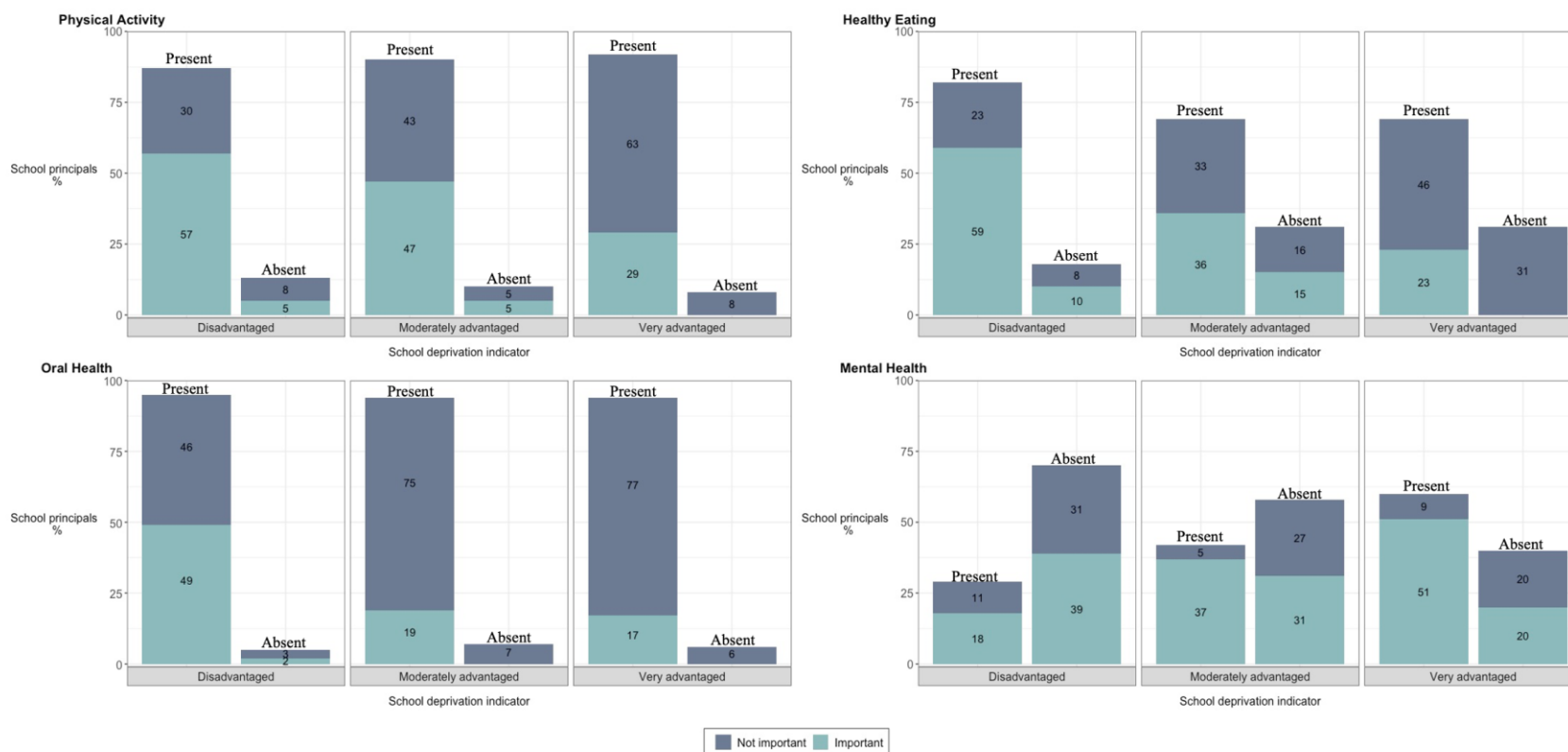


Figure S3. Proportion of school principals according to availability of physical activity, healthy eating, oral health, and mental health-promoting interventions (present, absent) and perceived importance of health issue (important, not important) by deprivation category, Project PromeSS, Québec, Canada, 2017-19.



Stacked bar charts for physical activity, healthy eating, oral health, and mental health, show the proportion of school principals who reported that an HPI addressing the issue was present or absent (in the left and right bars respectively), and within each bar the proportion of principals who perceived that the health issue was or was not important, by school deprivation indicator. Four possible combinations are displayed for each health issue: (i) HPI available and issue was perceived as important; (ii) HPI available but issue was not perceived as important; (iii) HPI absent but issue was perceived as important; (iv) HPI absent and issue was not perceived as important.

Table S1. School principal responses to questionnaire items on perceived importance of specific health issues by grade, PromeSS study, Québec, Canada, 2017-19.

	n <sup>a</sup>	Extremely important %	Very important %	Important %	Not very important %	Not at all important %
In the past year, how important was each of the following health issues for your <b>Kindergarten students</b> ?						
Aggressive behaviour	163	7	15	18	48	12
Lack of physical activity	150	2	13	23	52	11
Unhealthy eating	162	2	6	28	59	6
Inadequate sleep	162	2	11	35	48	5
Problems with personal hygiene	162	1	4	24	62	8
Dental problems	146	2	6	18	68	5
Lack of respect for safety	163	5	9	21	57	8
Infections, viruses, parasites	153	2	10	27	57	5
ADHD	162	3	14	36	44	2
In the past year, how important was each of the following health issues for your <b>Grade 1 and 2 students</b> ?						
Aggressive behaviour	166	10	16	24	43	7
Lack of physical activity	153	2	10	27	51	9
Unhealthy eating	165	2	7	28	58	4
Inadequate sleep	164	1	11	38	46	4
Problems with personal hygiene	156	1	6	16	71	6
Dental problems	158	2	4	19	68	7
Lack of respect for safety	166	7	14	27	48	4
Infections, viruses, parasites	156	1	12	31	51	4
ADHD	166	3	19	48	29	1
In the past year, how important was each of the following health issues for your <b>Grade 3 and 4 students</b> ?						
Bullying	166	6	7	22	60	4
Aggressive behaviour	166	7	9	29	50	5
Lack of physical activity	153	1	7	30	52	9
Unhealthy eating	165	1	6	25	64	4
Inadequate sleep	164	2	9	34	51	4
Problems with personal hygiene	154	1	5	15	70	9
Dental problems	158	1	3	10	77	9
Lack of respect for safety	166	5	8	28	54	4
Infections, viruses, parasites	156	2	6	24	62	7
ADHD	165	2	19	46	30	2
Smoking (including e-cigarettes)	166	0	1	1	10	88
In the past year, how important was each of the following health issues for your <b>Grade 5 and 6 students</b> ?						
Bullying	166	9	16	36	36	4
Aggressive behaviour	166	5	11	28	49	7
Problems with mental health (e.g., anxiety)	165	6	18	43	26	7
Lack of physical activity	153	3	8	32	50	7
Unhealthy eating	165	1	7	25	62	5
Inadequate sleep	164	2	11	42	41	4
Concerns involving puberty	154	5	16	40	38	1
Dental problems	148	0	4	10	77	9
Lack of respect for safety	166	3	15	25	51	6
Infections, viruses, parasites	156	1	4	19	68	9
ADHD	166	2	19	37	40	1
Smoking (including e-cigarettes)	164	1	2	2	21	74

<sup>a</sup>Excludes participants with missing data or who reported “not applicable” or “don’t know”.

Table S2. Examples of health-promoting interventions according to specific health issues, PromeSS study, Québec, Canada, 2017-19.

Health issue	Government mandate <sup>a</sup>	Health-promoting interventions (HPI) <sup>b</sup>	
		Examples	Description of one intervention
Dental health	Yes	Dental hygiene program	Dental hygienist visits for school-wide screening of dental issues, accompanied by in-class presentations to students on proper teeth brushing technique.
Bullying and exclusion	Yes	Day of Pink; Vers le Pacifique; 24 Heures Texto.	Teacher leads in-class conversations with students on bullying, followed by a whole-school assembly.
Physical activity/active living	Yes	BOKS; Défi Pierre Lavoie; Terry Fox Run.	Students take turns pedaling on a stationary bicycle for 20 minutes during normal class activities. Kilometers are compiled and accumulated for the entire school.
Sex education	Yes	Workshop on puberty; Jouer et Vivre en Harmonie	Community organization offers workshops in online privacy, issues with diffusion of private sexual images, legal and criminal aspects of non-consensual distribution of intimate images.
Healthy eating	No	Croque Santé; Les Ateliers Cinq Épices; Brigades Culinaires.	Teacher hosts cooking workshops with rare and lesser-known healthy ingredients.
Personal safety and injury prevention	No	À Pied, À Vélo, Ville Active; Les Politesses Exquises; Cybercitoyenneté.	Community-based organization visits schools to talk to children about how to safely travel from home to school on their bicycle.
Mental health and well-being	No	Mental Health Day; Petits Coeurs Rieurs.	Teacher presents workshops to teach young children to verbalize emotions through storytelling.
Tobacco control	No	Campagne De Facto; Maison Jean Lapointe; La Gang Allumée.	Nurse and social worker partner to provide workshops on the health and environmental impacts of tobacco, with a trip to the city shore to pick up cigarette butts.

<sup>a</sup>Details on government mandates are presented in Supplementary Table 4.

<sup>b</sup>Intervention offered in English or French.

Table S3. Description of PromeSS study variables including questionnaire item(s), response choices and recoding of responses choices for analysis, PromeSS study, Québec, Canada, 2017-19.

Variable	Item(s)	Response choices	Responses recoded for analysis
School deprivation level	Indice de milieu socioéconomique (IMSE) (i.e., deprivation indicator) from the Québec database 2016-17	1 to 10	very advantaged (1-3), moderately advantaged (4-7), disadvantaged (8-10)
Current position in school	Respondent is...	school principal; school vice-principal; homeroom teacher; physical education teacher; other	
Academic year		2016-17; 2017-18; 2018-19	
School board		As is (name of school board)	
Language of instruction	Language of instruction (based on official language in schoolboard)	French; English	
Length of interview	Length of interview (sum of both interview parts) in minutes	As is (minutes)	
Number of students	How many students were registered in your school on September 30 in....?	Kindergarten, grade 1-6, other, special education classes (English-speaking schools only), reception class (for immigrant children/students), language classes (French-speaking schools only)	Number of students in the school (sum of the number of students in each class)
Number of teachers	How many of the following staff members work in your school?	Teachers (full time, part time), professional staff (full time, part time), health professional staff (full time, part time), special education staff (full time, part time), support staff (full time, part time), daycare services staff (full time, part time)	Number of teachers (sum of full- and part-time teachers)
Students living in single-parent household	How many students in your school....come from households in which students live with only one parent, regardless of the reason (separation, divorce, widow/widower)?	As is (number or %)	
Students from low income households	How many students in your school come from low-income households?	As is (number or %)	
Students using daycare services	How many students in your school use school daycare services	As is (number or %)	
Percentage of students at risk	How many students in your school are considered at risk or SHSMLD (students with handicaps, social maladjustments or learning difficulties)?	As is (number)	

Mother tongue	Please indicate the percentage of students whose mother tongue is...French; English; Other	French, English, other	
School neighbourhood	Which setting best describes your immediate school neighborhood?	Urban, suburban, rural	
Teacher turnover	Indicate your level of agreement. In the past 3 years your school experienced...Teacher turnover	Several staff; some staff; few staff; no turnover in the past 3 years; no turnover in more than 3 years	High turnover (several staff, some staff), low turnover (few staff, no turnover in the past 3 years, no turnover in more than 3 years)
Principal turnover	Indicate your level of agreement. In the past 3 years your school experienced...Principal turnover	3 or more in 3 years; 2 in 3 years; 1 in 3 years; 0 in 3 years; 0 in more than 3 years	High turnover (3 or more in 3 years, 2 in 3 years), low turnover (1 in 3 years, 0 in 3 years, 0 in more than 3 years)
Kindergarten - Importance of health issues	In the past year, how important was each of the following health issues for your kindergarten students? 1)aggressive behaviour; 2)lack of physical activity; 3) unhealthy eating; 4)inadequate sleep; 5) problems with personal hygiene (e.g. hand washing, teeth brushing, bathing, etc.); 6) dental problems; 7) lack of respect for safety (voluntary or involuntary); 8) infections, viruses, parasites (e.g. gastroenteritis, flu, lice); 9) ADHD; 10) Other	extremely important; very important; important; not very important; not at all important	
Grade 1 and 2 - Importance of health issues	In the past year, how important was each of the following health issues for your Grade 1 and 2 students? 1)Aggressive behaviour; 2)Lack of physical activity; 3) Unhealthy eating; 4)Inadequate sleep; 5) Problems with personal hygiene (e.g. hand washing, teeth brushing, bathing, etc.); 6) Dental problems; 7) Lack of respect for safety (voluntary or involuntary); 8) Infections, viruses, parasites (e.g. gastroenteritis, flu, lice); 9) ADHD; 10) Other	extremely important; very important; important; not very important; not at all important	
Grade 3 and 4 - Importance of health issues	In the past year, how important was each of the following health issues for your Grade 3 and 4 students? 1) Bullying; 2) Aggressive behaviour; 3) Lack of physical activity; 4) Unhealthy eating; 5) Inadequate sleep; 6) Problems with personal hygiene (e.g. hand washing, teeth brushing, bathing, etc.); 7) Dental problems; 8) Lack of respect for safety (voluntary or involuntary); 9) Infections, viruses, parasites (e.g. gastroenteritis, flu, lice); 10) ADHD; 11) Smoking (including e-cigarettes) 12) Other	extremely important; very important; important; not very important; no at all important	



Grade 5 and 6 - Importance of health issues	How important are each of the following health issues for your Grade 5 and 6 students? 1) Bullying; 2) Aggressive behaviour; 3) Problems with mental health (e.g. anxiety); 4) Lack of physical activity; 5) Unhealthy eating; 6) Inadequate sleep; 7) Concerns involving puberty (e.g. physical changes, personal hygiene, girl/boy relations, etc.); 8) Dental problems; 9) Lack of respect for safety (voluntary or involuntary); 10) Infections, viruses, parasites (e.g. gastroenteritis, flu, lice); 11) ADHD; 12) Smoking (including e-cigarettes); 13) Other	extremely important; very important; important; not very important; no at all important	
Health-promoting interventions	In the past year, has your school offered any health-promoting interventions in which participation is expected at the group, class, grade or school-level to address.....? (i) physical activity/active living (not including physical education classes that are part of the curriculum); (ii) sex education (e.g. healthy human development, respectful interactions between boys and girls, etc.); (iii) healthy eating; (iv) bullying and exclusion; (v) personal safety and injury prevention (e.g. playing safe; potential risks at home, in community, outdoors; safe use of technology, etc.); (vi) mental health and well-being; (vii) oral health; (viii) multi-component/issue; (ix) other	No, yes. If yes, how many? (number of activities).	
Tobacco control intervention	Does your school currently have a tobacco control intervention (prevention and/or education)?	No, yes	
Sex	Are you...?	female; male	
Age	How old are you?	<30; 30-39; 40-49; 50-59; ≥ 60	<30 = 30; 30-39 = 34.5; 40-49 = 44.5; 50-59 = 54.5; >60 = 60.
Highest level of education	What is the highest level of education that you have completed?	Bachelor's degree, graduate diploma or certificate, Master's, PhD	
Years experience in current school	How many years have you been working in your school as a... ( <i>current position</i> )?	< 1, 1-3, 4-6, 7-9, ≥ 10	< 1 = 1; 1-3 = 2; 4-6 = 5; 7-9 = 8; >10 = 10.
Years experience overall	How many years of experience do you have working as a...( <i>current position</i> )?	< 1, 1-3, 4-6, 7-9, ≥ 10	< 1 = 1; 1-3 = 2; 4-6 = 5; 7-9 = 8; >10 = 10.

Table S4. Characteristics of elementary schools and participants retained in the sample, Project PromeSS, Québec, Canada, 2017-19 (n = 171).

<i>School characteristic</i>	
School deprivation, % <sup>a,b</sup>	
Very advantaged	20.5
Moderately advantaged	43.9
Disadvantaged	35.7
Language of instruction in school board, % <sup>a,b</sup>	
French	82.5
English	17.5
No. students in school, median (IQR)	267 (271)
No. teachers in school, median (IQR)	20 (17)
Percent students whose mother tongue is...., median (IQR)	
French	97.7 (23.7)
English	0.9 (9.8)
Other	1.0 (5.0)
School neighborhood, % <sup>a</sup>	
Urban	24.6
Suburban	35.7
Rural	39.8
Percent students in single-parent households, mean (SD)	28.1 (16.8)
Percent students in low-income families, mean (SD)	27.5 (23.7)
Percent students using school daycare services, mean (SD)	45.3 (21.4)
Percent students at risk, mean (SD)	27.3 (13.8)
High teacher turnover, % <sup>a</sup>	42.1
High principal turnover, % <sup>a</sup>	21.7
<i>Participant characteristic</i>	
Female, % <sup>a</sup>	69.0
Age, mean (SD) <sup>c</sup>	47.3 (7.4)
Current position, % <sup>a</sup>	
School principal	93.0
Vice-principal	4.1
Teacher	2.9
Level of education, % <sup>a</sup>	
Bachelor	19.9
Graduate diploma or certificate	31.6
Master/PhD	46.2
Number of years working in current school, mean (SD) <sup>d</sup>	3.4 (2.6)
Number of years working in current position, mean (SD) <sup>d</sup>	7.1 (3.4)

<sup>a</sup>Denominators exclude missing data.

<sup>b</sup>Data extracted from published governmental reports.

<sup>c</sup>Mean age was determined by attributing the following values to each response category: <30 = 30; 30-39 = 34.5; 40-49 = 44.5; 50-59 = 54.5; >60 = 60.

<sup>d</sup>Mean number of years was determined by attributing the following values to each response category: Less than 1 = 1; 1-3 = 2; 4-6 = 5; 7-9 = 8; ≥10 = 10.

Table S5. Relative risks and 95% confidence intervals from unadjusted modified Poisson regression models for perceived importance of health issue by school deprivation level<sup>a</sup> PromeSS study, Québec, Canada, 2017-19.

Health issue	School deprivation indicator <sup>a</sup>		
	Disadvantaged vs. moderately advantaged (ref)	Moderately vs. very advantaged (ref)	Disadvantaged vs. very advantaged (ref)
Attention deficit hyperactivity disorder	1.0 (0.8, 1.2)	1.0 (0.8, 1.3)	1.0 (0.8, 1.3)
Aggressive behavior	1.1 (0.9, 1.3)	1.2 (0.9, 1.7)	1.3 (0.9, 1.8)
Mental health <sup>b</sup>	0.8 (0.7, 1.1)	1.0 (0.7, 1.2)	0.8 (0.6, 1.1)
Inadequate sleep	1.1 (0.9, 1.4)	1.3 (0.9, 1.9)	1.5 (1.0, 2.1)
Lack of respect for safety	1.2 (0.9, 1.5)	1.1 (0.8, 1.7)	1.3 (0.9, 1.9)
Bullying <sup>b</sup>	1.1 (0.8, 1.4)	1.0 (0.7, 1.5)	1.1 (0.8, 1.6)
Concerns about puberty <sup>b</sup>	1.1 (0.8, 1.5)	1.0 (0.7, 1.4)	1.1 (0.7, 1.5)
Lack of physical activity	1.2 (0.9, 1.6)	<b>1.8 (1.0, 3.2)<sup>c</sup></b>	<b>2.2 (1.2, 3.8)<sup>c</sup></b>
Unhealthy eating	<b>1.4 (1.0, 1.8)<sup>c</sup></b>	<b>2.2 (1.2, 4.3)<sup>c</sup></b>	<b>3.0 (1.6, 5.7)<sup>c</sup></b>
Infections, viruses, parasites	<b>1.4 (1.0, 2.1)<sup>c</sup></b>	0.9 (0.6, 1.5)	1.3 (0.8, 2.0)
Problems with personal hygiene <sup>b</sup>	<b>1.7 (1.1, 2.5)<sup>c</sup></b>	1.5 (0.7, 3.2)	<b>2.5 (1.3, 5.2)<sup>c</sup></b>
Dental health problems	<b>2.7 (1.6, 4.7)<sup>c</sup></b>	1.1 (0.5, 2.6)	<b>3.0 (1.4, 6.4)<sup>c</sup></b>
Cigarette smoking <sup>b</sup>	0.9 (0.2, 4.0)	1.9 (0.2, 16.2)	1.7 (0.2, 16.0)

Separate regression models were constructed for each health issue.

<sup>a</sup>All schools with at least 30 students across Québec are ranked according to a school deprivation indicator (IMSE), with scores ranging from 1 (lowest deprivation) to 10 (highest deprivation)<sup>31</sup>. Schools were grouped into three categories based on the IMSE score: schools serving very advantaged (IMSE 1-3), moderately advantaged (IMSE 4-7) or disadvantaged (IMSE 8-10) students.

<sup>b</sup>School principals provided data for specific grade levels.

<sup>c</sup>Bold indicates that the 95% confidence intervals do not include the value of 1.

Table S6. Governmental mandates by health topic, PromeSS study, Québec, Canada, 2017-19.

Health topic	Excerpt	Year of current mandate	Reference
Dental health	<p>“Adapted preventive dental services in schools for children at risk of tooth decay:                      - individualized preventive dental care                      - application of dental sealants.”                      (Translated from French)</p>	2015	<p>Ministère de la Santé et des Services sociaux (2015) <i>Programme national de santé publique 2015-2025</i>. Available at: <a href="https://publications.msss.gouv.qc.ca/msss/fichiers/2015/15-216-01W.pdf">https://publications.msss.gouv.qc.ca/msss/fichiers/2015/15-216-01W.pdf</a>.</p>
Bullying and exclusion	<p>“Every public and private educational institution will be required to adopt and implement an anti-bullying and anti-violence plan. The plan must include prevention measures to put an end to all forms of bullying and violence and measures to encourage parents to collaborate in preventing and stopping bullying and violence and in creating a healthy and secure learning environment, specify the actions to be taken and the supervisory or support measures to be offered when an act of bullying or violence is observed, determine the disciplinary sanctions applicable to bullying and violence and specify the follow-up to be given to any report or complaint concerning an act of bullying or violence.”</p>	2012	<p>National Assembly of Québec (2012) <i>An Act to prevent and stop bullying and violence in schools</i>. Available at: <a href="http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=5&amp;file=2012C19A.PDF">http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=5&amp;file=2012C19A.PDF</a>.</p>
Physical activity/ active living	<p>“Encourage elementary students and children in educational childcare centres to move for 60 minutes per day.”</p>	2017	<p>Ministère de l’Éducation, du Loisir et du Sport (2017) ‘Quebecers on the move! Policy on physical activity, sport and recreation’. Available at: <a href="http://www.education.gouv.qc.ca/filadmin/site_web/documents/loisir-sport/Policy_Quebecers_on_the_move.pdf">http://www.education.gouv.qc.ca/filadmin/site_web/documents/loisir-sport/Policy_Quebecers_on_the_move.pdf</a>.</p>
Sex education	<p>“Every student will receive from 5 to 15 hours of sexuality education per year. It is compulsory in elementary and secondary school and is available at the kindergarten level in the schools that wish to offer it.”</p>	2018	<p>Ministère de l’Éducation et de l’Enseignement supérieur (2018) <i>Learning content in sexuality education</i>. Available at: <a href="http://collections.banq.qc.ca/ark:/52327/3547856">http://collections.banq.qc.ca/ark:/52327/3547856</a> (Accessed: 29 February 2020).</p>
Healthy eating	N/A	N/A	N/A
Personal safety and injury prevention	N/A	N/A	N/A
Mental health and well-being	N/A	N/A	N/A
Tobacco control	N/A	N/A	N/A

Table S7. Relative risk and 95% confidence intervals from unadjusted modified Poisson regression models for the availability of specific health-promoting interventions at school, according to school deprivation level<sup>a</sup>, PromeSS study, Québec, Canada, 2017-19.

Health-promoting intervention	School deprivation indicator <sup>a</sup>		
	Disadvantaged vs. moderately advantaged (ref)	Moderately vs. very advantaged (ref)	Disadvantaged vs. very advantaged (ref)
Dental health <sup>b</sup>	1.0 (0.9, 1.1)	1.0 (0.9, 1.1)	1.0 (0.9, 1.1)
Bullying and exclusion <sup>b</sup>	1.0 (0.9, 1.1)	1.0 (0.9, 1.1)	1.0 (0.8, 1.1)
Physical activity/active living <sup>b</sup>	1.0 (0.9, 1.1)	1.0 (0.9, 1.1)	1.0 (0.8, 1.1)
Sex education <sup>b</sup>	1.1 (1.0, 1.3)	1.0 (0.8, 1.2)	1.1 (0.9, 1.3)
Healthy eating	1.2 (1.0, 1.4)	1.0 (0.8, 1.3)	1.2 (0.9, 1.5)
Personal safety and injury prevention	1.4 (0.9, 2.0)	0.7 (0.5, 1.1)	1.0 (0.7, 1.5)
Mental health and well-being	0.7 (0.4, 1.1)	0.7 (0.5, 1.0)	<b>0.5 (0.3, 0.8)<sup>c</sup></b>
Tobacco control	1.6 (0.6, 4.5)	1.4 (0.3, 6.6)	2.3 (0.5, 10.3)

Separate models were constructed for each health-promoting intervention.

<sup>a</sup>All schools with at least 30 students across Québec are ranked according to a province-wide school deprivation indicator (IMSE), with scores ranging from 1 (lowest deprivation) to 10 (highest deprivation)<sup>20</sup>. Schools were grouped into three categories based on the IMSE score: schools serving very advantaged (IMSE 1-3), moderately advantaged (IMSE 4-7) or disadvantaged (IMSE 8-10) students.

<sup>b</sup>Intervention is government-mandated (see Supplementary Table 4).

<sup>c</sup>Bold indicates that the 95% confidence intervals do not include the value of 1.

## **5.2 ARTICLE 2. Health-promoting school culture: How do we measure it and does it vary by school neighborhood deprivation?**

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**AUTHORS' CONTRIBUTIONS.** JK conceptualized the study and research objectives, helped collect the data, prepared the analytic plan, conducted statistical analyses, interpreted the results, and wrote, reviewed and revised the manuscript. All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

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## ABSTRACT

**Background:** The context in which school-based health-promoting interventions are implemented is key for the delivery and success of these interventions. However, little is known about whether school culture differs by school deprivation.

**Methods:** Using data from PromeSS, a cross-sectional study of 161 elementary schools in Québec, Canada, we drew from the Health Promoting Schools theoretical framework to develop four measures of health-promoting school culture (i.e., *school physical environment, school/teacher commitment to student health, parent/community engagement with the school, ease of principal leadership*) using exploratory factor analysis. One-way ANOVA with post-hoc Tukey-Kramer analyses was used to examine associations between each dimension and social and material deprivation in the school neighborhood.

**Results:** Factor loadings supported the content of the measures and Cronbach's alpha indicated good reliability (range: 0.68-0.77). As social deprivation in the school neighborhood increased, both school/teacher commitment to student health and parent/community engagement with the school decreased.

**Implications for School Health Policy, Practice, and Equity:** Implementation of health-promoting interventions in schools located in socially deprived neighborhoods may require adapted strategies to address challenges related to staff commitment and parental and community involvement.

**Conclusion:** The measures developed herein can be used to investigate school culture and interventions for health equity.

## **INTRODUCTION**

Social inequalities in health are prevalent in high-income countries<sup>1</sup> and intervening early in childhood is key to reducing health inequalities in adulthood.<sup>2</sup> Because most children regardless of socioeconomic background spend much of their time at school, school-based health-promoting interventions have the potential to reach all students and thus to help alleviate the effect of social inequalities in health.<sup>3,4</sup> Implementation scientists are increasingly concerned with studying the school context and assessing the fit between interventions and the context in which they are implemented.<sup>5</sup> In the Health Promoting Schools (HPS) framework developed by the World Health Organization (WHO), school health promotion is conceptualized as a whole school approach wherein health is not only promoted through interventions, but also through the school environment.<sup>4</sup> School culture is part of this context, defined as the way a school functions and the values, norms, beliefs and behaviours shared between staff, students and the school community.<sup>6,7</sup> A supportive school culture denotes what is expected, supported, and rewarded within the school, and has been identified as a facilitator for the implementation of health-promoting interventions.<sup>8,9</sup> Understanding which specific elements of the school context facilitate health promotion is crucial to helping all schools, and especially schools serving disadvantaged students, implement well-adapted, effective health-promoting interventions for their students. In this study, our focus was twofold: i) the measurement of a health-promoting school culture, which embodies the specific organizational values, expectations, and policies that influence implementation of health-promoting interventions, and ii) the association between dimensions of a health-promoting school culture and school deprivation.

### **Limited Evidence on Social Inequalities In School Culture**



School-based health promotion is an important strategy to improve the health of children; it is especially critical for students growing up in socioeconomically deprived neighborhoods, who are disproportionately affected by health issues and learning difficulties.<sup>10</sup> Yet in previous work, we identified a social gradient in student health needs and the availability of health-promoting interventions across schools serving students from advantaged and disadvantaged backgrounds.<sup>11</sup> Schools serving more disadvantaged students may face additional barriers in implementing interventions such as lack of material, financial and human resources, higher workloads and heavier student health and social needs, all of which could result in less commitment within the school community for health promotion programming.<sup>12,13</sup> Although establishing a health-promoting school culture may be more challenging in disadvantaged schools, few studies have investigated this association. Markham and Aveyard reported that among schools serving disadvantaged students, those with a culture providing more effective support and boundaries had a lower smoking prevalence among students.<sup>14</sup> They hypothesized that students in these schools were more likely to adopt the school's health-promoting values. Despite their call for further studies on school culture as a target for prevention interventions and to narrow social inequalities in health, research in this realm remains scarce.

### **Lack of Consensus and Psychometric Evaluation Of School Culture Measurement**

This gap may in part relate to the fact that methods for measuring school culture are highly variable and rarely evaluated for construct or criterion-related validity and reliability.<sup>15</sup> Multiple terms and definitions are used to refer to school culture including school ethos, school climate, and organizational culture. Often, components of school culture are measured as part of a broader school health construct which may include student demographics, health issues and lifestyle habits

such as substance abuse<sup>16</sup>, and quality of life at school.<sup>17,18</sup> Few studies are grounded in theory, although some authors have developed scales to evaluate implementation of the HPS approach in schools and included school culture-related concepts.<sup>15</sup> Situating school culture measures theoretically is important to assess construct validity and interpret new findings in relation to established frameworks. Further, a recent systematic review of school health assessment tools identified only seven of 649 studies on health-promoting schools that assessed the psychometric properties of the scales used.<sup>15</sup> These shortcomings make comparisons between studies difficult and hinder evidence building in this field.

### **Study Objectives**

The objective was to examine whether dimensions of health-promoting school culture were associated with socioeconomic deprivation of the school neighborhood. The study was conducted in two phases with the following specific objectives: (1) to develop a theoretically informed and reliable measure of health-promoting school culture drawing on the HPS theoretical framework; and (2) to investigate whether scores for dimensions of health-promoting school culture differed according to social and material deprivation.

### **METHODS**

Data for both phases were drawn from the PromeSS Study, a cross-sectional survey conducted in 2016-19, that aimed to investigate social inequalities in school-based health-promoting interventions.<sup>11</sup> The PromeSS sample of schools for this current study was selected from among all 1807 elementary schools in the province of Québec, Canada. Private schools (i.e., where tuition is paid in part by students' families), schools serving only special needs students with intellectual

impairments and learning difficulties, and schools that were not assigned a deprivation indicator by the government (because they served fewer than 30 students) were excluded. All 69 school boards (now known as service centers) were approached and 32 (46%) approved recruitment of schools in their jurisdictions. Of 594 eligible elementary schools, 291 (49%) responded to initial contact and of these, 171 (59%) agreed to participate.

Data were collected in structured telephone interviews with school informants, administered by trained interviewers in French or English. School principals were asked to select one key informant (i.e., themselves or a nominated staff member familiar with the process of planning and implementing health-promotion in the school) who had worked in the school for at least 6 months. School informants received a copy of the questionnaire prior to the interview. Data were collected across three academic years (2016-17, 2017-18, 2018-19). Questionnaire development was guided by the PromeSS conceptual model.<sup>11</sup> Questionnaire items were drawn/adapted from questionnaires used in previous work<sup>19,20</sup> or developed *de novo* using peer-reviewed and grey literatures. Full details on sampling and data collection procedures have been previously published.<sup>11</sup>

The PromeSS Study received ethics approval from the Centre hospitalier de l'Université de Montréal (CHUM) Ethics Review Committee and the CHUM certificate of ethics approval (2013-4130, CE 12.307) was available to all eligible schoolboards and school principals on request. The current study received ethics approval from the Comité d'éthique de la recherche en sciences et en santé (CERSES) at the University of Montreal (CERSES-21-056-R).

## **Phase 1: Measures of Health-Promoting School Culture**

We drew on the HPS theoretical framework<sup>4</sup> to conceptualize health-promoting school culture as characteristics of the school environment that facilitate implementation of health-promoting interventions. Three key principles were used to guide development of our health-promoting school culture measure: (1) health-promoting interventions and health education objectives are formally incorporated in the curriculum; (2) the school social environment (i.e., values shared and embodied by staff, emphasis on health promotion in school policies) as well as physical environment (i.e., facilities and equipment available for health-promoting interventions and that facilitate healthy lifestyle habits) informally support student health and well-being; and (3) the school cultivates links to engage parents and the wider community to improve student health.<sup>4,21</sup>

**Measures.** Four health-promoting school culture scales were developed. The first three (i.e., *school/teacher commitment to student health*, *school physical environment*, and *parent/community engagement in the school*) were developed using exploratory factor analysis (EFA) of 18 items selected because they aligned with contextual elements in the HPS framework.<sup>4</sup> Variable names and descriptive statistics for each item are presented in Table S1. Response options included strongly agree, agree, neither agree nor disagree, disagree, and strongly disagree. Responses were recoded from 1 (strongly disagree) to 5 (strongly agree). Scale-building procedures are described in the Data analysis section.

The fourth scale, *ease of principal leadership*, included seven items: “In this school how difficult is it for the principal to... (i) demonstrate leadership for change, (ii) establish a climate of openness to innovation, (iii) ensure that instructional goals are clearly communicated to everyone, (iv) secure resources for health-promoting interventions, (v) foster respect, (vi) establish a safe and

orderly school environment, (vii) guide the staff in the process of solving problems”. Response options included very easy, easy, neither easy nor difficult, difficult, and very difficult, which we recoded from 1 (very difficult) to 5 (very easy). Responses were summed and divided by the number of items responded to, to create a mean score for ease of principal leadership.

**Data Analysis.** We conducted a EFA estimated by maximum-likelihood extraction with Oblimin rotation, to test structural validity and multidimensionality (i.e., to identify among the 18 items considered, items that are strongly correlated one with the other, but weakly correlated with the other items; and to group these items into separate factors).<sup>22,23</sup> We used a three-factor model to examine whether all 18 items loaded onto the expected three dimensions inspired by the HPS framework. Items retained were summed and divided by the total number of items responded to create a mean score for each dimension and labeled “school/teacher commitment to student health”, “school physical environment”, and “parent/community engagement in the school”. Cronbach’s alpha was computed to assess internal consistency of each resulting scale, as well as ease of principal leadership, with  $\alpha > 0.6$  considered acceptable.<sup>24</sup>

## **Phase 2: Association Between Health-Promoting School Culture and School Deprivation**

**Measures.** Socioeconomic deprivation of the school neighborhood was estimated using the Pampalon et al. deprivation indices,<sup>25</sup> which are based on census statistics pertaining to the dissemination area corresponding to each school postal code. Dissemination areas are the smallest geographical units for which the 2016 Canadian Census data from Statistics Canada are available. *Social deprivation* (i.e., fragility of social networks in the community) was measured based on: the proportion of people living alone among those  $\geq 15$  years old; the proportion of people who

are separated, divorced or widowed among those  $\geq 15$  years old; and the proportion of single-parent families. *Material deprivation* (i.e., lack of access to everyday goods and amenities) was measured based on: the proportion of persons  $\geq 15$  years old without a high school diploma or equivalent; the employment to population ratio among those  $\geq 15$  years old; and the average income of the population  $\geq 15$  years old. Values were categorized into population-weighted quintiles (i.e., five groups with approximately the same population size) from least deprived (first quintile) to most deprived (fifth quintile). To describe our sample, we dichotomized the quintiles into low deprivation (1-3) and high deprivation (4-5).

Sociodemographic variables used to describe the study sample included *size of community* which was measured using the population center index developed by Statistics Canada with data from the 2016 Canadian Census. Population centers are groupings of dissemination areas and are classified into four groups: rural area; small population center (population between 1,000 and 29,999); medium population center (population between 30,000 and 99,999); and large urban population center (population of 100,000 or more).<sup>26</sup> PromeSS school postal codes were matched to population center data and the variable was dichotomized as rural/small population center and medium/large population center. School informants provided data on *language of instruction* (French; English), *principal turnover in the past 3 years* (0-1 change;  $\geq 2$  changes), *teacher turnover in the past 3 years* (low or none; high), and *number of students* in the school. School informant characteristics included *current position in the school* (principal; vice-principal; teacher), and *number of years of experience in current school* (less than 1; 1-3; 4-6; 7-9;  $> 10$ ). Finally the “*Indice de milieu socioéconomique*” developed by the Québec Ministry of Education<sup>27</sup> to characterize the socioeconomic status of the student body for each school was used for

descriptive purposes. It is computed by summing composite scores calculated for each student in the school using their mother's education and parental employment. Schools are categorized in decile ranks with higher scores representing higher levels of deprivation.<sup>28</sup> We re-categorized this variable as schools serving advantaged students (ranks 1-3), moderately advantaged students (4-7) or disadvantaged (8-10) students. Table S2 provides details on all study variables including questionnaire items used to obtain the data, response options and recoding of response options for analysis.

**Data Analysis.** One-way ANOVA with post-hoc Tukey-Kramer analyses were used to compare means for each of the four dimensions of health-promoting school culture across schools by five levels of social and material deprivation separately. Analyses were performed using SPSS, Version 27.0 (Released 2020. IBM SPSS Statistics for Macintosh, Version 27.0. Armonk, NY: IBM Corp.).

## RESULTS

The sample comprised 161 elementary schools with available Statistics Canada data for computation of the school deprivation indices. Over half (57%) of schools were located in rural/small population centers and 43% were located in medium/large population centers. One-fifth (21%) of school informants reported high principal turnover, and 42% reported high teacher turnover. Pampalon indices indicated that half (50%) of schools were in high material deprivation (quintiles 4-5) and 38% were in high social deprivation (quintiles 4-5) settings. Based on the "Indice de milieu socioéconomique", our sample of schools was similar to all eligible elementary schools in Québec (n=1795). Specifically 21% of schools in our sample served very advantaged students vs. 24% of all eligible elementary schools; 44% vs. 39% served moderately advantaged

students, and 36% vs. 38% served disadvantaged students.<sup>31</sup> Most schools provided instruction in French (83%), which was similar to the population of all eligible elementary schools in Québec (90%), and the median number of students per school ( $n = 267$ ) was similar to that in all eligible schools ( $n = 259$ ).<sup>26</sup> School informants were principals (93%), vice-principals (4%) or teachers (3%). The mean length of time spent working in the current school was 3.4 (SD = 2.6, range = 1-10) years.

### **Phase 1: Measures of Health-Promoting School Culture**

All items selected for EFA were normally distributed; kurtosis of most items was  $<2.0$  and skewness was  $<1.35$  (Table S1). Analysis of the rotated pattern matrix showed that items loaded onto three factors as expected (Table 1). Two items did not load on any factor and were removed. These included '*Physical activity is provided on all days when there is no physical education class to all students (not including activities during lunch, recess or before/after school)*' and '*Access to indoor and outdoor facilities for physical education, extracurricular and other physical activities belonging to other schools or community/private organizations is available to all students (does not include municipal parks)*'. Scores were computed for school/teacher commitment to student health (4 items), school physical environment (7 items), and parent/community engagement in the school (5 items).



Table 1. Factor Loadings for 18 School Culture-Related Questionnaire Items, PromeSS Study 2017-19

Items	Rotated Pattern Matrix Factor Loadings <sup>a</sup>		
	1	2	3
Meetings with teachers are well attended by parents	0.01	<b>-0.37</b>	0.04
Parents attend school-sponsored events	0.15	<b>-0.70</b>	-0.07
PPO (Parent Participation Organization) or Home & School meetings are well attended by parents	0.13	<b>-0.66</b>	-0.08
Parent volunteers are easy to recruit	0.07	<b>-0.71</b>	0.08
Community partners (e.g. community organizations, etc.) are involved in the planning and implementation of joint activities or interventions	0.00	<b>-0.35</b>	0.24
Teachers in your school are innovative, always seeking out new ways to facilitate students' progress	<b>0.54</b>	-0.09	-0.05
Teachers in your school have a real interest in the health of the students	<b>0.78</b>	-0.03	0.04
Teachers in your school are committed to promoting healthy behaviours in their students	<b>0.79</b>	-0.08	0.03
The amount of emphasis on health promotion in your school's educational project is sufficient	<b>0.33</b>	-0.14	0.12
Area provided for eating meals is pleasant and inviting	0.02	-0.01	<b>0.44</b>
Food distribution (including cafeteria, daycare, outside food suppliers, nutritional support programs) prioritizes foods of good nutritional value	-0.05	-0.03	<b>0.36</b>
Measures are in place to foster active transportation (e.g. crossing guards, secure bike racks, etc.)	0.09	0.04	<b>0.30</b>
Physical activity is provided on all days when there is no physical education class to all students (not including activities during lunch, recess or before/after school) <sup>b</sup>	0.09	0.11	0.18
Indoor facilities for physical education, extracurricular, and other physical activities meet the needs of all students	0.03	0.10	<b>0.63</b>
Outdoor facilities for physical education, extracurricular, and other physical activities meet the needs of all students	-0.15	-0.19	<b>0.69</b>
Indoor school physical activity facilities are available to all students outside the class timetable	0.15	0.04	<b>0.48</b>
Outdoor school physical activity facilities are available to all students outside the class timetable	-0.08	-0.18	<b>0.64</b>
Access to indoor and outdoor facilities for physical education, extracurricular and other physical activities belonging to other schools or community/private organizations is available to all students (does not include municipal parks) <sup>b</sup>	0.12	-0.08	0.23

Note. Bold indicates factor loadings > 0.3

<sup>a</sup>Exploratory factor analysis of school-culture related items aligned with the Health Promoting Schools framework supported grouping items as (1) school/teacher commitment to student health, (2) parent/community engagement with the school, and (3) school physical environment. Factor loadings can be interpreted as correlation coefficients between items and factors.

<sup>b</sup>Item did not load onto any factor and was removed.

Cronbach's alpha coefficients for the three HPS-based dimensions of health-promoting school culture and the ease of principal leadership measure ranged from 0.68 to 0.77 (Table 2). Correlation coefficients among the four scales ranged from 0.29 to 0.49 and kurtosis and skewness for all four measures were < 1.6.

Table 2. Descriptive Statistics and Internal Consistency of Four Measures of Health-Promoting School Culture, PromeSS Study 2017-19

Dimension	Number of items	Mean (SD)	Median	Range	Cronbach's alpha	Correlation between measures		
						1	2	3
1. School/teacher commitment to student health	4	4.11 (0.53)	4.00	2.00-5.00	0.703	-	-	-
2. School physical environment	7	3.62 (0.64)	3.71	1.17-5.00	0.676	<b>0.382</b>	-	-
3. Parent/community engagement in the school	5	3.76 (0.64)	3.80	1.75-5.00	0.730	<b>0.413</b>	<b>0.292</b>	-
4. Ease of principal leadership	7	3.84 (0.50)	3.86	2.57-5.00	0.767	<b>0.485</b>	<b>0.232</b>	<b>0.303</b>

SD = Standard deviation

Note. Statistically significant correlations between measures at  $p \leq 0.01$  are indicated in bold.

## Phase 2: Association Between School Deprivation and Health-Promoting School Culture

One-way ANOVA results indicated that the mean scores for two of the four school culture scales investigated (i.e., school physical environment and ease of principal leadership) did not differ across schools according to our indices of social and material deprivation (Table 3). Despite an omnibus test p-value of 0.075, there was a gradient in school/teacher commitment to student health by social deprivation. Specifically, school/teacher commitment decreased from 4.23 to 3.95 from the first to the fifth quintile of the school social deprivation indicator. Finally, there was a statistically significant difference in scores for parent/community engagement with the school according to social deprivation ( $F(4, 156) = [4.661]$ ,  $p = 0.001$ ). The Tukey-Kramer post hoc test for multiple comparisons suggested that the mean value of parent/community engagement with the school was significantly higher in quintile 1 than in quintile 5 ( $p = 0.007$ , 95% C.I. = [0.099, 0.933]). Similarly, the mean value was also higher in quintile 2 compared to quintile 5 ( $p = 0.018$ , 95% C.I. = [0.0539, 0.878]).

Table 3. Association Between School Deprivation and Each of Four Dimensions of School Culture, PromeSS Study 2017-19

	n	Mean (SD)	One-way ANOVA Omnibus Test p-value
<b>School/teacher commitment to student health</b>			
Social deprivation quintiles <sup>a</sup>			0.075
Q1 (least deprived)	33	4.23 (0.54)	
Q2	35	4.25 (0.45)	
Q3	32	3.99 (0.62)	
Q4	32	4.10 (0.54)	
Q5 (most deprived)	29	3.95 (0.47)	
Material deprivation quintiles <sup>a</sup>			0.082
Q1 (least deprived)	18	4.19 (0.48)	
Q2	27	3.87 (0.59)	
Q3	35	4.08 (0.58)	
Q4	36	4.23 (0.46)	
Q5 (most deprived)	45	4.16 (0.51)	
<b>School physical environment</b>			
Social deprivation quintiles <sup>a</sup>			0.939
Q1 (least deprived)	33	3.72 (0.72)	
Q2	35	3.64 (0.59)	
Q3	32	3.64 (0.66)	
Q4	32	3.59 (0.57)	
Q5 (most deprived)	29	3.60 (0.63)	
Material deprivation quintiles <sup>a</sup>			0.117
Q1 (least deprived)	18	3.91 (0.47)	
Q2	27	3.66 (0.53)	
Q3	35	3.45 (0.63)	
Q4	36	3.71 (0.69)	
Q5 (most deprived)	45	3.61 (0.65)	
<b>Parent/community engagement in the school</b>			
Social deprivation quintiles <sup>a</sup>			0.001
Q1 (least deprived)	33	4.04 (0.57) <sup>b</sup>	
Q2	35	3.99 (0.53) <sup>c</sup>	
Q3	32	3.68 (0.65)	
Q4	32	3.64 (0.57)	
Q5 (most deprived)	29	3.52 (0.66) <sup>b,c</sup>	
Material deprivation quintiles <sup>a</sup>			0.584
Q1 (least deprived)	18	4.00 (0.55)	
Q2	27	3.81 (0.68)	
Q3	35	3.72 (0.58)	
Q4	36	3.78 (0.58)	
Q5 (most deprived)	45	3.74 (0.68)	
<b>Ease of principal leadership</b>			
Social deprivation quintiles <sup>a</sup>			0.196
Q1 (least deprived)	30	4.00 (0.52)	
Q2	29	3.87 (0.49)	
Q3	28	3.86 (0.55)	
Q4	28	3.77 (0.47)	
Q5 (most deprived)	24	3.68 (0.42)	
Material deprivation quintiles <sup>a</sup>			0.453
Q1 (least deprived)	18	3.92 (0.52)	
Q2	27	3.67 (0.45)	
Q3	35	3.87 (0.52)	
Q4	36	3.86 (0.52)	
Q5 (most deprived)	45	3.87 (0.49)	

<sup>a</sup>The distribution of social and material deprivation of the school neighborhood was divided into quintiles by the Institut national de santé publique du Québec (INSPQ) and used as is; 1<sup>st</sup> quintile is least deprived and 5<sup>th</sup> is most deprived. The mean (SD) was computed separately for descriptive purposes; the variable was used continuously in the models.

<sup>b,c</sup>Tukey-Kramer Post Hoc test: means with the same letter indicate a significant difference. Any difference between two means carrying different letters is significant at  $p > 0.05$ .

## **DISCUSSION**

In this study, we drew on the HPS theoretical framework to develop measures of health-promoting school culture and investigate the association between these measures and school deprivation. We built four psychometrically-validated scales to assess four dimensions of health-promoting school culture including school/teacher commitment to student health, school physical environment, parent/community engagement with the school, and ease of principal leadership. We then studied the associations between these scales and school deprivation and detected an association between social deprivation in the school neighborhood and parent/community engagement with the school. In addition, the data suggested that there may be a gradient in school/teacher commitment to student health according to school-level social deprivation.

### **Psychometric Properties of School Culture Measures**

To the best of our knowledge, no other study has used the HPS framework to develop theoretically grounded measures of health-promoting school culture. Our conceptualization of school culture was grounded in HPS theory and the EFA 3-factor model supported the structural validity of the measures that we developed<sup>29,30</sup> (i.e., that the measures are an adequate reflection of the dimensionality of the health-promoting school culture construct to be measured<sup>31</sup>). In comparison, one study used different theoretical definitions to operationalize a quality of school life scale unspecific to school culture, which included items on teacher-student relationships, school activities, physical environment, and negative and positive feelings towards the school.<sup>18</sup> Others have developed measures to evaluate the HPS approach in schools, but the authors did not explicitly link them to a theoretical foundation<sup>32</sup>; they did not assess the psychometric properties of their scale<sup>33,34</sup>; they focused on one dimension only<sup>33</sup>; or they included items or dimensions

beyond school culture. The Scale for Health Promoting Schools (SHPS) was highlighted in a systematic review by Kazemitabar et al. as a reliable and comprehensive tool to describe schools based on the HPS framework.<sup>15</sup> Although it was not developed specifically to measure school culture, two of the seven dimensions identified in factorial analysis of the 50-item SHPS mirror the dimensions identified in our study.<sup>35</sup> Specifically, “community links” parallels our parent/community engagement dimension, and the “school physical environment”<sup>35</sup> was identified in both studies. Among other dimensions in this scale, some items referred to healthy school policies and teacher support for health-promoting interventions, but no dimension specifically measured school/teacher commitment to student health or principal leadership.

The health-promoting school culture measures developed herein are structurally valid and internally reliable and in addition, are not exclusively intended for use in contexts where comprehensive school health approaches (such as HPS) have been implemented. If the internal reliability of these measures is replicated, we suggest that they can be integrated into school health promotion research (e.g., to assess whether school culture relates to intervention effectiveness, to identify whether factors such as social inequality relate to school culture, to assess changes in school culture after implementation of interventions). In other studies using the same PromeSS dataset, our measures were associated with success of health-promoting interventions as perceived by school informants<sup>36</sup> as well as with sustainment of health-promoting interventions.<sup>37</sup>

### **Health-Promoting School Culture and Social and Economic Deprivation**

Parent/community engagement differed between the most and least socially deprived schools. It is possible that resources in community organizations located in disadvantaged neighborhoods

are more limited in quantity and/or quality,<sup>38,39</sup> which could limit schools in developing partnerships with the community. In addition, known challenges for parent involvement in school life include lack of time,<sup>40</sup> especially for parents from lower socioeconomic backgrounds who may work long hours or at multiple jobs.<sup>41</sup> Parents and other community members may also be hesitant to become involved in school life if they do not anticipate being treated as equal partners by school staff.<sup>42</sup> Building strong connections with parents and the community can lead to an increased sense of community identity and empowerment<sup>43</sup> which can represent important social resources for health promotion in disadvantaged schools. Interestingly, we did not detect an association between school neighborhood material deprivation and parent/community engagement with the school in this study. It is possible that the social deprivation variable captures social inequality related to income inequality, and also reflects the challenges of single-parent families (i.e., difficulty finding time and childcare resources to attend school meetings and to become involved in school activities<sup>44</sup>) and community organizations in socially deprived neighborhoods (e.g., higher social deprivation is associated with lower social cohesion and social capital<sup>45</sup>).

We note that scores for school/teacher commitment to student health varied by material deprivation but did not show a linear increase or decrease. There was however, a gradient by social deprivation in this scale. Although not detectable at the 0.05 level, this finding could be important given that other studies have identified staff commitment and school prioritization of health as key factors for health promotion effectiveness.<sup>36,46,47</sup> Factors that might explain why commitment is lower in more deprived schools include staff facing urgent social and educational needs which take precedence over health needs, and staff having lower confidence that any intervention will make a difference for students. In a qualitative study of principals and school health coordinators in

elementary schools, although staff held strong beliefs in the synergistic importance of health and learning, many felt that the pressure on schools to deliver health promotion was a challenge, particularly in deprived neighborhoods.<sup>48</sup> Better integration of school, parental and societal components in school health promotion was identified as an urgent need to address these challenges.<sup>48</sup> Whole-school programs that benefit from funding and partnerships could encourage shared responsibility for health promotion in the whole school community and alleviate the burden on teachers.

### **Implications for School Health Policy, Practice, and Equity**

Schools may want to implement strategies to address challenges related to parental involvement, such as tailoring the schedule and style of parent-teacher meetings to better align with parental needs, providing childcare during meetings, hiring translators, and conducting home visits.<sup>42</sup> Other strategies could include highlighting the benefits of community partnerships for school staff and encouraging them to become more familiar with organizations in the school neighborhood.<sup>49</sup> Principals and staff may feel unprepared to establish and engage with external partners,<sup>50,51</sup> and learning from other schools who have successfully developed such partnerships can be beneficial.<sup>39</sup> School districts and/or school boards could provide training and help schools connect to share their experiences.

We noted that school physical environment and ease of principal leadership, which have been associated with health promotion effectiveness in other studies,<sup>36,46,47</sup> did not vary by school deprivation in PromeSS. If confirmed, this has positive implications for school health promotion across schools. In Québec, it is possible that ministerial intervention to minimize the impact of

deprivation (e.g., through targeted programs such as the “Stratégie d’Intervention Agir Autrement” (SIAA) which provides additional funding and support to disadvantaged schools<sup>52</sup>) help alleviate the effects of social inequalities on school culture, at least for these dimensions. Schools cannot eliminate social inequalities on their own, especially when it relates to issues affecting parents and the community, and systemic changes necessitate policies above the school level.<sup>53,54</sup> Research is needed to discern whether social, financial and material resources can decrease workloads so that school staff can devote more time to health promotion, make it easier for principals to coordinate whole-school initiatives, and facilitate building links with the community.<sup>39</sup>

### **Limitations**

Although our sample of schools was similar to all eligible elementary schools in Québec,<sup>11,27</sup> the relatively low response proportion of eligible school boards and schools may have limited generalizability of the findings. The small sample size may have limited detection of some associations. Finally, data collected from a single school informant has drawbacks including the potential for social desirability bias and recall bias which may have resulted in inaccurate portrayal of the school. Given that most informants were school principals, they may be at risk of overestimating their capacity and may or may not recognize teacher leadership for health promotion. However, the PromeSS questionnaire was sent to informants prior to the interview, and they were encouraged to consult other staff in preparation for the interview.

### **CONCLUSION**

The development of psychometrically sound measures of health-promoting school culture will permit more in-depth study of school culture across jurisdictions and identification of actionable



factors associated with school culture. We detected associations between social deprivation in the school neighborhood and each of parent/community engagement with the school and school/teacher commitment to student health. If replicated, these data will inform interventions that aim to reduce social inequalities in school health promotion.

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## SUPPLEMENTARY MATERIAL

Table S1. Descriptive statistics for items used in exploratory factor analysis for the development of school culture scales based on the Health Promoting Schools theoretical framework, PromeSS Study, Québec, Canada, 2017-19

Item	N	Range	Mean	Median	SD	Skewness	Kurtosis
The amount of emphasis on health promotion in your school's educational project is sufficient.	170	2-5	3.84	4.00	0.96	-0.66	-0.241
Teachers in your school are innovative, always seeking out new ways to facilitate students' progress	171	2-5	4.06	4.00	0.70	-0.51	0.49
Teachers in your school have a real interest in the health of the students	171	2-5	4.34	4.00	0.61	-0.42	0.27
Teachers in your school are committed to promoting healthy behaviours in their students	150	2-5	4.26	4.00	0.70	-0.89	1.23
In your school, area provided for eating meals is pleasant and inviting	169	1-5	3.46	4.00	0.96	-0.64	-0.02
In your school, food distribution (including cafeteria, daycare, outside food suppliers, nutritional support programs) prioritizes foods of good nutritional value	148	1-5	4.02	4.00	0.83	-1.35	2.92
In your school, measures are in place to foster active transportation (e.g., crossing guards, secure bike racks, etc.)	171	1-5	3.39	4.00	1.23	-0.64	-0.62
In your school, physical activity is provided on all days when there is no physical education class to all students (not including activities during lunch, recess or before/after school)	171	1-5	2.92	3.00	1.28	0.13	-1.18
In your school, indoor facilities for physical education, extracurricular, and other physical activities meet the needs of all students	171	1-5	3.82	4.00	1.00	-1.23	1.40
In your school, outdoor facilities for physical education, extracurricular, and other physical activities meet the needs of all students	171	1-5	3.71	4.00	1.06	-0.68	-0.27
In your school, indoor school physical activity facilities are available to all students outside the class timetable	171	1-5	2.97	3.00	1.25	0.00	-1.24
In your school, outdoor school physical activity facilities are available to all students outside the class timetable	171	1-5	4.03	4.00	0.93	-1.30	2.03
In your school, access to indoor and outdoor facilities for physical education, extracurricular and other physical activities belonging to other schools or community/private organizations is available to all students (does not include municipal parks)	165	1-5	3.36	4.00	1.28	-0.61	-0.80
In your school, meetings with teachers are well attended by parents	171	1-5	4.23	4.00	0.78	-1.25	2.26
In your school, parents attend school-sponsored events	171	2-5	4.01	4.00	0.71	-0.51	0.46
In your school, PPO (Parent Participation Organization) or Home & School meetings are well attended by parents	114	1-5	3.43	4.00	1.21	-0.49	-0.86
In your school, parent volunteers are easy to recruit	171	1-5	3.47	4.00	1.04	-0.28	-0.83

In your school, community partners (e.g. community organizations, etc.) are involved in the planning and implementation of joint activities or interventions	171	1-5	3.54	4.00	0.95	-0.55	-0.27
In this school, how easy is it for the principal to demonstrate leadership for change?	146	2-5	3.90	4.00	0.83	-0.54	-0.06
In this school, how easy is it for the principal to establish a climate of openness to innovation?	146	1-5	3.86	4.00	0.88	-0.79	0.45
In this school, how easy is it for the principal to ensure that instructional goals are clearly communicated to everyone?	146	2-5	3.89	4.00	0.69	-0.90	1.57
In this school, how easy is it for the principal to secure resources for health-promoting interventions?	145	1-5	4.47	4.00	0.83	-0.48	-0.25
In this school, how easy is it for the principal to foster respect?	146	3-5	4.21	4.00	0.60	-0.11	-0.41
In this school, how easy is it for the principal to establish a safe and orderly school environment?	146	2-5	3.86	4.00	0.75	-0.47	0.22
In this school, how easy is it for the principal to guide the staff in the process of solving problems?	146	1-5	3.71	4.00	0.82	-0.73	0.51

SD = Standard deviation

Table S2. Description of PromeSS study variables including questionnaire item(s), response choices and recoding choices for analysis, PromeSS Study, Québec, Canada, 2017-19

Variable	[Study name – blinded] item(s)	Response choices	Responses recoded for analysis
Academic year		2016-17; 2017-18; 2018-19	
Number of students	How many students were registered in your school on September 30 in....?	Kindergarten, grade 1-6, other, special education classes (English-speaking schools only), reception class (for immigrant children/students), language classes (French-speaking schools only)	Number of students in the school (sum of the number of students in each class)
Current position in school	Respondent is...	school principal; school vice-principal; homeroom teacher; physical education teacher; other	
Sex	Are you...?	female; male	
Years of experience in current school	How many years have you been working in your school as a... ( <i>current position</i> )?	< 1, 1-3, 4-6, 7-9, ≥ 10	< 1 = 1; 1-3 = 2; 4-6 = 5; 7-9 = 8; >10 = 10.
School/teacher commitment to student health ( $\alpha=0.7$ )	Indicate your level of agreement. (i) the amount of emphasis on health promotion in your school's educational project is sufficient, (ii) teachers in your school are innovative, always seeking out new ways to facilitate students' progress, (iii) teachers in your school have a real interest in the health of the students, (iv) teachers in your school are committed to promoting healthy behaviours in their students.	1.Strongly disagree; 2. Disagree; 3. Neither agree or disagree; 4. Agree; 5. Strongly agree	Responses were summed and divided by the number of items responded to, to create a mean score
School physical environment ( $\alpha=0.7$ )	Indicate your level of agreement. In your school... (i) area provided for eating meals is pleasant and inviting, (ii) food distribution (including cafeteria, daycare, outside food suppliers, nutritional support programs) prioritizes foods of good nutritional value, (iii) measures are in place to foster active transportation (e.g. crossing guards, secure bike racks, etc.), (iv) indoor facilities for physical education, extracurricular, and other physical activities meet the needs of all students, (v) outdoor facilities for physical education, extracurricular, and other physical activities meet the needs of all students, (vi) indoor school physical activity facilities are available to all students outside the class timetable, (vii) outdoor school physical activity facilities are available to all students outside the class timetable.	1.Strongly disagree; 2. Disagree; 3. Neither agree or disagree; 4. Agree; 5. Strongly agree	Responses were summed and divided by the number of items responded to, to create a mean score

<p>Parent/community engagement in the school (<math>\alpha=0.7</math>)</p>	<p>Indicate your level of agreement. In your school... (i) meetings with teachers are well attended by parents, (ii) parents attend school-sponsored events, (iii) PPO (Parent Participation Organization) or Home &amp; School meetings are well attended by parents, (iv) parent volunteers are easy to recruit, (v) community partners (e.g., community organizations, etc.) are involved in the planning and implementation of joint activities or interventions.</p>	<p>1.Strongly disagree; 2. Disagree; 3. Neither agree or disagree; 4. Agree; 5. Strongly agree</p>	<p>Responses were summed and divided by the number of items responded to, to create a mean score</p>
<p>Principal leadership (<math>\alpha=0.8</math>)</p>	<p>Indicate the level of difficulty. In this school how difficult is it for the principal to... (i) demonstrate leadership for change, (ii) establish a climate of openness to innovation, (iii) ensure that instructional goals are clearly communicated to everyone, (iv) securing resources for health-promoting interventions, (v) foster respect, (vi) establish a safe and orderly school environment, (vii) guide the staff in the process of solving problems.</p>	<p>1.Strongly disagree; 2. Disagree; 3. Neither agree or disagree; 4. Agree; 5. Strongly agree</p>	<p>Responses were summed and divided by the number of items responded to, to create a mean score</p>

Table S3. Reliability statistics and scale skewness and kurtosis for four scales of dimensions of health-promoting school culture (n = 171), PromeSS Study, Québec, Canada, 2017-19

Scale (Cronbach's alpha)	Scale skewness	Scale kurtosis	Item	Corrected item to total correlation	Cronbach's alpha if item deleted
School/teacher commitment to student health (0.70)	-0.52	0.70	The amount of emphasis on health promotion in your school's educational project is sufficient.	0.34	0.77
			Teachers in your school are innovative, always seeking out new ways to facilitate students' progress	0.40	0.70
			Teachers in your school have a real interest in the health of the students	0.65	0.57
			Teachers in your school are committed to promoting healthy behaviours in their students	0.68	0.52
School physical environment (0.68)	-0.71	1.59	In your school, area provided for eating meals is pleasant and inviting	0.31	0.66
			In your school, food distribution (including cafeteria, daycare, outside food suppliers, nutritional support programs) prioritizes foods of good nutritional value	0.34	0.66
			In your school, measures are in place to foster active transportation (e.g., crossing guards, secure bike racks, etc.)	0.28	0.68
			In your school, indoor facilities for physical education, extracurricular, and other physical activities meet the needs of all students	0.49	0.61
			In your school, outdoor facilities for physical education, extracurricular, and other physical activities meet the needs of all students	0.47	0.62
			In your school, indoor school physical activity facilities are available to all students outside the class timetable	0.40	0.64
			In your school, outdoor school physical activity facilities are available to all students outside the class timetable	0.45	0.63
Parent/community engagement with the school	-0.28	-0.01	In your school, meetings with teachers are well attended by parents	0.30	0.75

(0.73)			In your school, parents attend school-sponsored events	0.66	0.64
			In your school, PPO (Parent Participation Organization) or Home & School meetings are well attended by parents	0.50	0.69
			In your school, parent volunteers are easy to recruit	0.67	0.61
			In your school, community partners (e.g. community organizations, etc.) are involved in the planning and implementation of joint activities or interventions	0.41	0.71
Principal leadership (0.77)	0.19	0.15	In this school, how easy is it for the principal to demonstrate leadership for change?	0.50	0.74
			In this school, how easy is it for the principal to establish a climate of openness to innovation?	0.60	0.71
			In this school, how easy is it for the principal to ensure that instructional goals are clearly communicated to everyone?	0.36	0.76
			In this school, how easy is it for the principal to secure resources for health-promoting interventions?	0.36	0.77
			In this school, how easy is it for the principal to foster respect?	0.50	0.74
			In this school, how easy is it for the principal to establish a safe and orderly school environment?	0.53	0.73
			In this school, how easy is it for the principal to guide the staff in the process of solving problems?	0.60	0.71

### **5.3 ARTICLE 3. Mental health-promoting interventions in elementary schools: school context correlates of availability and alignment with evidence-based practices**

Under review at *Journal of School Psychology*

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## **ABSTRACT**

**Background:** Schools are ideal settings to promote mental health and well-being in youth, but not all schools offer mental health-promoting interventions (MHPIs). Our objectives were to identify school context correlates of MHPI availability in elementary schools, and to characterize MHPIs implemented in study schools according to alignment with established best practices.

**Methods:** Data were drawn from PromeSS, a cross-sectional study of 171 public elementary schools in Quebec, Canada (2016-19). We examined the association between each of 17 variables related to school context and MHPI availability in multivariable logistic regression models. Cross-case analysis was used to categorize a convenience sample of 25 MHPIs according to intervention characteristics (i.e., evidence-based content and adaptation to school context), estimate their expected effectiveness, and compare implementation practices.

**Results:** Of 171 schools, 41% had offered at least one MHPI in the past year. Seven factors were associated with MHPI availability: higher student body socioeconomic status; English language of instruction; mental health issues perceived as important in the school; higher scores for parent/community engagement with the school; and high teacher turnover. Most MHPIs were well-adapted to the school context. However, many interventions had little evidence-based content (e.g., did not adopt a whole-school approach) and few adhered to implementation best practices. Expected effectiveness was low for these MHPIs.

**Conclusion:** MHPI availability is associated with the socioeconomic status of the student body and school culture. Schools need support to select evidence-based MHPIs and to implement them according to best practices.

## INTRODUCTION

Youth mental health is increasingly viewed as an important public health concern. One in five adults experience mental illness in the US and Canada,<sup>1</sup> and many mental health issues manifest in childhood or adolescence.<sup>2</sup> In Québec, the prevalence of diagnosed anxiety disorders among 12-17 year-olds increased from 8.6% in 2010-11 to 17.2% in 2016-17.<sup>3</sup> Even in the absence of mental illness, the prevalence of flourishing mental health (defined as high positive emotions and functioning) is markedly lower among Canadian youth age 15-24 than adults over age 25.<sup>4</sup> Early intervention to decrease this burden and to promote positive mental health is critical and several authors document the effectiveness of school-based mental health-promoting interventions (MHPIs).<sup>5-7</sup>

Schools provide children with an environment to learn and socialize, and universal MHPIs (i.e., interventions delivered to all students, not just those at risk of mental health issues)<sup>8</sup> can benefit academic learning as well as health and well-being.<sup>9</sup> Importantly, school-based MHPIs can reach all children regardless of socioeconomic background.<sup>10</sup> However, it is not yet standard to offer such programs in all schools.<sup>9</sup> Differential availability and variation in MHPI quality could exacerbate health inequalities since students from disadvantaged backgrounds are disproportionately affected by vulnerability factors affecting their mental health.<sup>3,11</sup> Previously, we reported that less than half of 171 elementary schools studied in Québec, Canada offered MHPIs, and there was an apparent social inequality in availability – 30% of schools serving disadvantaged students had offered MHPIs in the past year compared to 60% of schools serving advantaged students.<sup>12</sup> Unlike physical activity, sex education,<sup>12</sup> dental health and bullying which fall under ministerial mandates in Québec (i.e., schools must address these health issues with HPIs

of their own choosing),<sup>13–16</sup> mental health promotion is not mandated. The decision to implement MHPIs is at the discretion of each school, and little is known about factors affecting MHPI availability.

Increasingly research suggests that variation in the availability and implementation of school-based HPIs relates to school contextual factors (e.g., organisational capacity, management practices, supportive school culture, leadership, teacher training and support)<sup>17,18</sup>, which can affect the choice of HPI, its content as well as the quality of its implementation.<sup>19</sup> Better understanding of school contextual factors could shed light on why planning and implementation of MHPIs is often challenging, especially in disadvantaged settings.<sup>9</sup> To date however, most studies investigating the implementation and effectiveness of MHPIs focus on characteristics of the HPI itself rather than school and contextual factors.<sup>20</sup>

In addition, little is known of the extent to which school-based MHPIs reflect the evidence on effective interventions.<sup>11</sup> Reviews including meta-analyses<sup>6,8,21–23</sup> report that the characteristics of effective universal MHPIs include a sequenced step-by-step program (in contrast to a one-time activity), active forms of teaching, a focus on skill development rather than information-sharing only, a whole-school approach making changes to the school environment and culture, delivery by staff internal to the school, and having families participate. Similarly, factors related to successful MHPI implementation include having a formal coordination team, a set of implementation guidelines, training for MHPI delivery, having a champion advocate for and lead implementation, having support from the school principal, planning for evaluation of implementation processes and HPI outcomes, and institutionalizing the intervention by integrating it into the school's written

orientations.<sup>5,6,8,21–26</sup> Although these reviews support use of these interventions, few studies provide “big-picture” overviews of MHPIs across schools in general. Researchers may know what makes an intervention likely to produce benefits for students’ mental health, but not necessarily whether or how MHPIs currently delivered in schools align with these best practices.

In this study, we examine MHPIs in terms of availability in schools and alignment with evidence-based practices. The specific objectives were: (i) to identify school context correlates of MHPI availability in elementary schools in Québec, Canada; and (ii) to characterize MHPIs currently implemented in elementary schools according to their alignment with established best practices.

### **Theoretical framework**

This study draws on Health Promoting Schools (HPS) as a theoretical framework for the implementation of holistic, comprehensive, whole-school health promotion<sup>27</sup>. Alignment with this approach can be assessed in accordance with three key principles: (i) health promotion is delivered through interventions and the school curriculum; (ii) the school social environment (values, attitudes, policies) and physical environment (facilities, equipment) informally support student health and well-being; and (iii) the school engages with families and the community<sup>28,29</sup>. A focus on optimizing the school environment and adaptation to school context are essential.<sup>30</sup>

### **METHODS**

Data were drawn from PromeSS, a cross-sectional study conducted in 2016-19 that investigated social inequalities in school-based HPIs in Québec, Canada.<sup>12</sup> The sample was drawn from all 1807 public elementary schools in Québec. Private schools (where families pay fees to partially

cover tuition), schools serving special needs students with intellectual impairments or learning difficulties, and schools that were not assigned a deprivation indicator by the government (because they served <30 students) were excluded. Schools in Québec are organized into 72 school boards (now called service centers) based on location and language (French, English); three were excluded because they served Northern and Indigenous communities exclusively or held special status. The remaining 69 school boards were approached and 32 (46%) approved our recruiting schools in their jurisdictions. Of 594 eligible elementary schools, 291 (49%) responded to the initial contact and of these, 171 (59%) agreed to participate.

School principals were asked to nominate a key informant (i.e., themselves or another staff member familiar with planning and implementing HPIs in the school) who had worked in the school for at least 6 months. PromeSS data collection comprised structured two-part telephone interviews of school informants administered by trained interviewers in French or English. In part one, data were collected on school characteristics and HPI availability. In part two, school informants selected one HPI for in-depth questioning on the process of planning, implementing, and evaluating that HPI. Full details on data collection are available elsewhere.<sup>12</sup>

The PromeSS Study received ethics approval from the Centre hospitalier de l'Université de Montréal (CHUM) Ethics Review Committee. The current study received ethics approval from the Comité d'éthique de la recherche en sciences et en santé (CERSES) at the University of Montreal (CERSES-21-056-R).

### **OBJECTIVE 1: Correlates of MHPI availability**

## Study variables

*MHPI availability* was measured by: “In the past year, has your school offered any MHPIs in which participation is expected at the group, class, grade, or school-level to address mental health and well-being?” MHPIs were defined as activities complementary to the educational curriculum delivered during class time to a large group (whole classes, grades or school) at no cost to students and for which attendance was mandatory.

We investigated 17 school context-related variables potentially associated with MHPI availability in three categories (i.e., school characteristics, school deprivation, and health-promoting school culture) selected based on the HPS model<sup>31</sup> and variables previously studied in the educational literature.<sup>32,33</sup> Ten variables related to school characteristics: (i) *language of instruction* (French; English); (ii) *number of students in the school*; (iii) *student/teacher ratio*; (iv) *proportion of students considered at-risk* (i.e., students identified by school staff as having vulnerability factors such as behavioral, social or learning difficulties that might affect their learning or behavior and require preventive or corrective measures); (v) *proportion of students absent per day*; (vi) *teacher turnover* (high; low); (vii) *principal turnover* (high; low); (viii) *perceived importance of mental health issues at school* was measured by asking “In the past year, how important were problems with mental health (e.g., anxiety) for your Grade 5 and 6 students?” We used it as a proxy for the importance of mental health issues in the whole school. Response options were recoded for analysis as important (extremely important, very important, important) or not important (not very important, not at all important); (ix) *total number of other HPIs offered in school* was measured by calculating the total number of HPIs offered for health themes other than mental health and well-being (i.e., physical activity/active living, healthy eating, personal safety and injury

prevention, bullying and exclusion, dental health, sex education); and (x) *rurality* of the school neighborhood which was measured using data from the Statistics Canada population centre index<sup>34</sup> for each school's postal code and was categorized as rural (population size > 29,999) or urban (population size  $\geq 30,000$ ).

Three variables related to school deprivation: (xi) *socioeconomic status of the student body*, using a school deprivation indicator developed by the Québec Ministry of Education ("Indice de milieu socioéconomique" or IMSE)<sup>35</sup> attributed to each school-based on aggregated data for each student in the school reflecting maternal education (high school completion) and parental unemployment. Decile scores ranging from 1 (lowest deprivation) to 10 (highest deprivation) were recoded as schools serving advantaged students (score 1-3), moderately advantaged students (4-7) or disadvantaged students (8-10). Socioeconomic deprivation in the neighbourhood in which the school was located was measured using two deprivation indices developed by Pampalon et al.<sup>36</sup> and matched to school postal codes; (xii) *Neighborhood social deprivation* was measured based on the proportion of people living alone among those age  $\geq 15$  years old; the proportion of people who were separated, divorced or widowed among those age  $\geq 15$  years old; and the proportion of single-parent families; (xiii) *Neighborhood material deprivation* was measured based on the proportion of persons without a high school diploma or equivalent among those age  $\geq 15$  years; the employment to population ratio among those  $\geq 15$  years old; and the average income of the population  $\geq 15$  years old. Dissemination areas were classified in quintiles from 1 (lowest deprivation) to 5 (highest deprivation).

Finally, four variables developed in previous work<sup>37</sup> measured health-promoting school culture: (xiv) *parent/community engagement in the school* (Cronbach's alpha: 0.73); (xv) *school physical environment* (Cronbach's alpha: 0.68); (xvi) *school/teacher commitment to student health* (Cronbach's alpha: 0.70); and (xvii) *principal leadership* (Cronbach's alpha: 0.77).

School informant characteristics included *current position in the school*; and *number of years of experience in current school*. Table S1 describes each variable in detail including questionnaire item(s), response options, coding for analysis, Cronbach's alpha for scales, and references if applicable.

### **Data analysis**

We computed the proportion of schools that reported having at least one MHPI in the past year for each potential correlate of MHPI availability. We then estimated each association in univariable and multivariable logistic regression models controlling for student body socioeconomic status, language of instruction and school size. To avoid issues of multiple testing, each potential correlate was investigated independently as a single hypothesis so that only two statistical tests were performed for each potential correlate. Analyses were performed using SPSS, Version 27.0 (Released 2020. IBM SPSS Statistics for Macintosh, Version 27.0. Armonk, NY: IBM Corp.).

### **OBJECTIVE 2: Categorization of 25 MHPIs according to best practices**

Of 171 HPIs selected for in-depth questioning by informants, 25 were MHPIs. Interventions were excluded if mental health was not the primary focus (e.g., an intervention designed to mainly address physical activity that the informant reported as also improving mental health). Names and



descriptions of MHPIs were recorded in writing and, if available, supplemented with information from the MHPI developer’s website. Basic characteristics used to describe MHPIs included *number of years offered* (range 1-10), *intervention developer* (de novo by the school, adopted from another organization), *perceived success of the intervention* (range: 1-5), and *perceived permanence of the intervention* (very permanent; moderately or not at all). The latter two measures were developed in previous work.<sup>38,39</sup>

We compiled a list of intervention- and implementation-related best practices associated with MHPI effectiveness.<sup>5–8,21–26</sup> PromeSS questionnaire items were aligned post hoc with this list, and best practices were categorized as present or not present for each MHPI in PromeSS based on responses to these items (Table 1).

Table 1. Measurement and coding of the presence of best practices for mental health-promoting interventions (MHPIs), PromeSS Study, Québec, Canada, 2017-19

Best practice	PromeSS questionnaire item and response choices	Best practice coded present if...
Intervention characteristics		
Active forms of learning	What type of learning strategies were used for [name of intervention]? Lecture strategies (presentations, demonstrations); Individual work (independent practice); Interactive teaching strategies (group discussion, role-play, modeling); Social constructivist teaching strategies (peer education, tutoring, collaborative and cooperative learning); Other (specify)	At least one of the following: Interactive teaching strategies; Social constructivist teaching strategies; Other response fits with definition of active teaching strategies
Focus on skill development rather than information-sharing only	Were any of the following core competencies incorporated into [name of intervention]? Self-esteem; Managing emotions and stress; Positive interactions with others; Self-awareness; Learning to saying “no”; Asking for help; Informed lifestyle choices; Adoption of prosocial choices; Management of social influences; Social engagement; Other (specify)	At least one core competency selected
Sequenced step-by-step program (rather than one-time activity)	[Name of intervention] was a...Special event (e.g., health fair, guest speaker at an assembly); Pedagogical activity; Learning and evaluation situation; Program; Other (specify)	Program
Targeting students of all grades	Which grades received [name of intervention]?	All or all but one grade in the school received the intervention
Changes to school environment and culture	Were there any other initiatives occurring in your school before or around the same time as the intervention that addressed mental health and wellbeing? Media campaign (e.g. posters, distribution of leaflets, social media); Assemblies; Extra-curricular activities; Linking to services offered by external organization; Infrastructure (e.g., installation of bike racks); Social environment (e.g., increased surveillance, support to students); School policy (e.g., nutrition, physical activity, bullying.); Special events; Other (specify)	Any category except Extra-curricular activities and Special events; Other response fits with the definition of changes to the school environment or culture

Involvement of families and community	Were the following members of the school community included in [name of the intervention]? Check all that apply. Families (invited to participate); Families (informed about intervention)	Families invited to participate
	Did your school work with any other organizations in relation to the [name of intervention]? Check all that apply. High school; Other elementary school; Organization that developed [name of intervention]; Local municipality; Police department; CISSS/CIUSSS (Centre intégré de santé et de services sociaux/Centre intégré universitaire de santé et de services sociaux); Community organization (specify); Not-for-profit organization (specify); For-profit organization (specify); Resource centre (i.e., organization engaged in information sharing, professional development in a specific domain); Other (specify)	At least one partner
Co-design of the intervention with school stakeholders	Who originally designed [name of intervention]? School principal; Vice principal; Homeroom teachers in your school; Other teachers in your school; Professional staff members in your school; Schoolboard (educational services, student services); University-based researcher or research team; Provincial Ministry; CISSS/CIUSSS (Centre intégré de santé et de services sociaux/Centre intégré universitaire de santé et de services sociaux); Community organization (specify); Not-for-profit organization (specify); For-profit organization (specify); Other (specify)	Any category of school staff (i.e., school principal, vice principal, teachers, professional staff members)
Adaptation of intervention by school	Prior to implementation, did your school make any modifications to [name of intervention]? No modifications were made: it could be used as is; No modifications were made: other reason; Yes, minor modifications; Yes, major modifications; Yes, but don't know if they were major or minor modifications; Don't know. An external agency implemented the intervention in our school.	Minor or major modifications prior to or during implementation
	Did [name of intervention] change during its implementation? Did not change at all; Underwent minor modifications; Underwent major modifications; Changed completely; Don't know. An external agency implemented the intervention in our school	
Program delivered in classroom by teachers	[Name of intervention] animators were... Check all that apply. Homeroom teachers; Other teachers; Student-peers; School health professionals (e.g. nurse, dental hygienist); External health professionals (e.g. physician); Members of a community organization; CEGEP or university students; Other (specify)	Any category internal to the school (i.e., homeroom teachers; other teachers; student-peers; school health professionals)
<b>Implementation</b>		
Guidelines for implementation	Indicate your level of agreement. The implementation team/The individuals who were responsible for planning the implementation developed a written plan to facilitate implementation. Strongly agree; Agree; Neither agree or disagree; Disagree; Strongly disagree	Strongly agree; Agree
Training for MHPI delivery	Indicate your level of agreement. Prior to implementing [name of intervention], training was provided to animators. Strongly agree; Agree; Neither agree or disagree; Disagree; Strongly disagree	Strongly agree; Agree
Process evaluation	Did your school do any of the following to evaluate [name of intervention]? Hold regular meetings; Obtain feedback from the [name of intervention] animators; Document the extent to which implementation was carried out in accordance with the plan; Document the number of students participating in the [name of intervention]; Document the barriers and facilitators to implementation; Formally evaluate the outcomes of the [name of intervention]; Other (specify)	At least one of the following: Documenting the extent to which implementation was carried out according to plan; Documenting barriers and facilitators to implementation
Outcome evaluation	Did your school do any of the following to evaluate [name of intervention]? Hold regular meetings; Obtain feedback from the [name of intervention] animators; Document the extent to which implementation was carried out in accordance with the plan; Document the number of students participating in the [name of intervention]; Document the barriers and facilitators to implementation; Formally evaluate the outcomes of the [name of intervention]; Other (specify)	Formally evaluating intervention outcomes
Institutionalization of intervention	Is [name of intervention] explicitly written in your school's orientations (e.g. the educational project, the success plan or others)?	Yes
Formal coordination team	Who was responsible for planning how [name of intervention] would be implemented in the first year? A team composed of members of the school staff; A team composed of members of the school staff and a partner organization; School principal; Vice principal; Homeroom teacher; Other teacher; External agency; [Name of intervention] developers; Other (specify)	A team
Program champion	Was there someone who advocated strongly for the intervention and supported its implementation despite barriers?	Yes
Involvement of school principal	What was your role during the implementation of [name of intervention]? Animator delivering the intervention to students; Member of the implementation team; Leader of the implementation team; No direct role during the implementation; Other (specify)	Member or leader of the implementation team. (Note: For all 25 MHPs, the informant was either the school principal or vice-principal)

## Data analysis

We conducted an exploratory cross-case analysis of the 25 MHPIs using a case-ordered meta-matrix display in which each row corresponded to an MHPI, and each column corresponded to an empirically and theoretically driven best practice.<sup>40-42</sup> The five steps in the cross-case analysis included: (i) organization of the 25 MHPIs and 18 best practice variables into a meta-matrix in which MHPIs were ordered by number of best practices present (Table S2). Two best practice variables (i.e., focus on skill development, active teaching strategies) were then removed from the list because they were present in all MHPIs; (ii) guided by the HPS theoretical framework,<sup>27</sup> patterns and potential links between the 16 remaining best practice variables were identified. This led to clustering these variables into three groupings: five variables (i.e., sequenced program, all grades, changes to school environment and culture, involvement of families, involvement of community) related to MHPI content; three (i.e., co-design, adaptations prior to or during implementation, delivery by teachers) related to level of adaptation of the MHPI to the school context; and the remainder (i.e., guidelines, training, process evaluation, outcome evaluation, institutionalization, coordination team, program champion, principal involvement) related to implementation of the MHPI; (iii) each MHPI was then rated according to the number of content-related best practices as high (4-5), moderate (3), or low (0-2). Similarly, each MHPI was rated according to number of adaptation-related best practices as high (2-3) or low (0-1) (Table S3). The implementation-related variables were left as is because they each captured different aspects of the implementation process and there was little theoretical basis for the interpretation of a computed score for implementation variables (contrary to intervention characteristics which aligned with the HPS); (iv) we then developed a typology of six MHPI categories based on the ratings for the content- and adaptation-related best practices. The typology comprised a double-axed continuum

with evidence-based content on the x-axis and adaptation to school context on the y-axis (Figure 1). We hypothesized that MHPIs with higher ratings would have higher expected effectiveness (Figure 2); and (v) finally, we color-coded the final meta-matrix to produce a heatmap of MHPI best practices and compared implementation best practices across MHPIs.

Figure 1. Categorization of mental health-promoting interventions (MHPIs) according to intervention content- and adaptation-related best practices, PromeSS Study, Québec, Canada, 2017-19

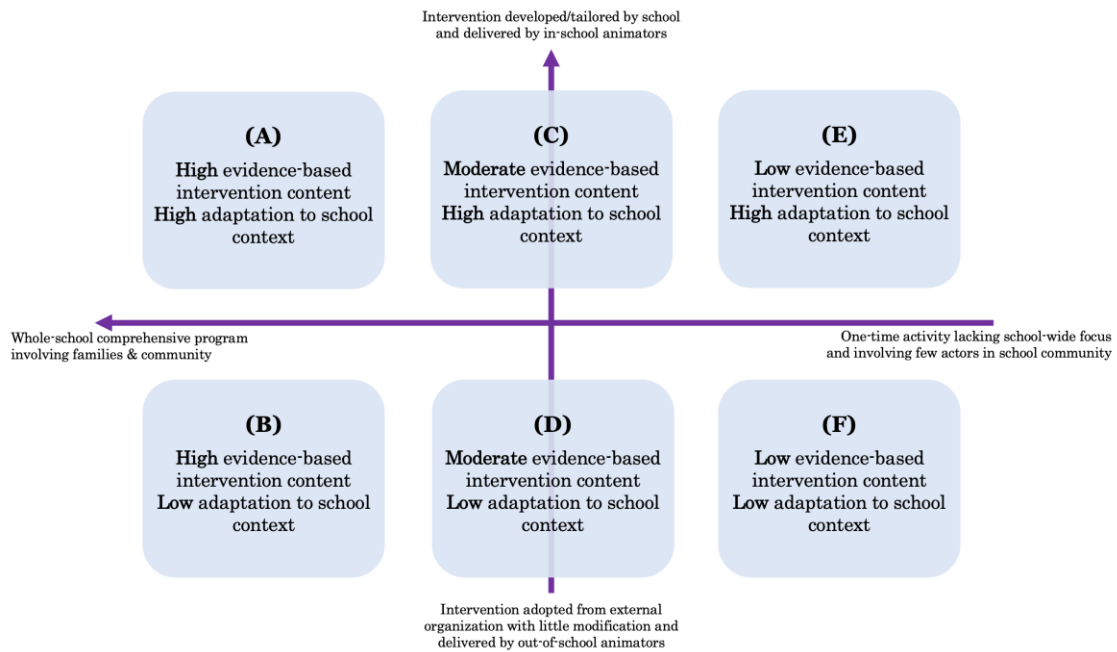
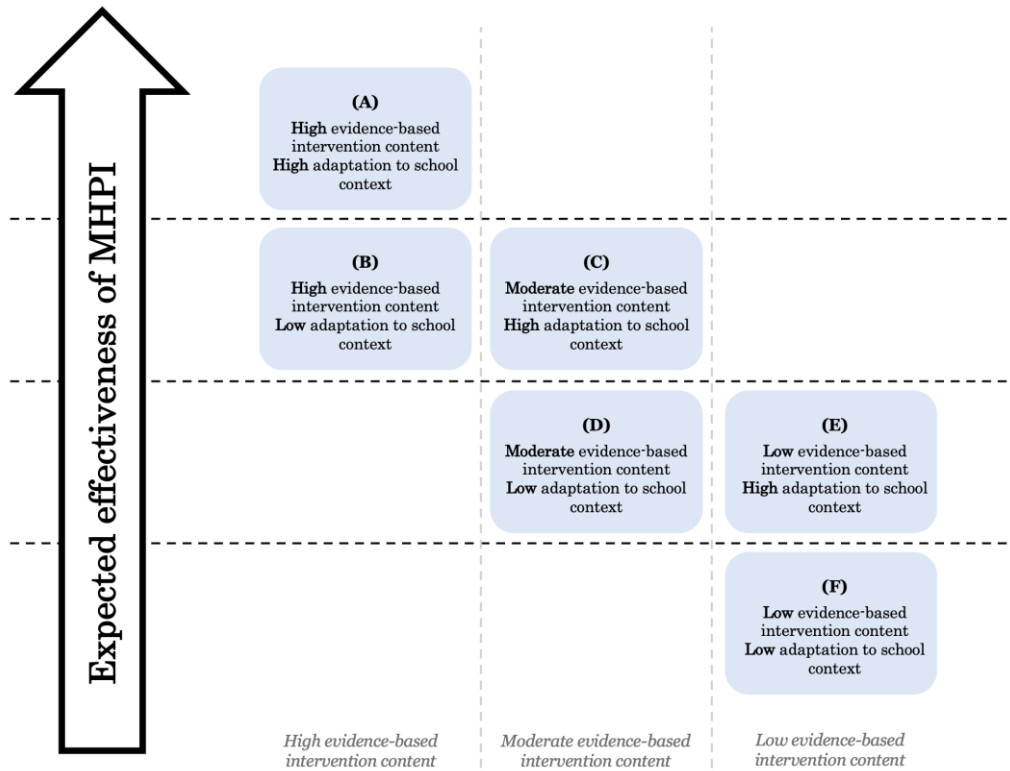


Figure 2. Expected effectiveness of mental health-promoting interventions (MHPI) according to intervention content- and adaptation-related best practices, PromeSS Study, Québec, Canada, 2017-19



## RESULTS

The 171 study schools were similar to all 1807 eligible elementary schools in Québec in language of instruction (i.e., 83% French schools compared to 90% in all eligible elementary schools), number of students (i.e., median 267 compared to 259 in all eligible elementary schools), and in the distribution of the IMSE deprivation indicator (i.e., 21% of PromeSS schools served very advantaged students compared to 24% of all eligible elementary schools; 44% vs. 39% served moderately advantaged students, and 36% vs. 38% served disadvantaged students). According to the Pampalon indices, 50% of PromeSS schools were located in more materially deprived settings (i.e., quintiles 4-5) and 38% in more socially deprived settings (i.e., quintiles 4-5). High teacher turnover was reported by 42% of schools and high principal turnover by 21% of schools.

Most (93%) school informants were principals, 4% were vice-principals, and 3% were teachers. Informants had spent a mean (SD) of 3.4 (2.6) years (range 1-10) working in their current school.

### School context correlates of MHPI availability

A total of 70 of 171 schools (41%) had offered at least one MHPI in the past year; of these, 49 schools (70%) offered one MHPI, 13 (19%) offered two, and 8 (11%) offered 3-6 MHPIs.

Five of 17 school context variables were associated with MHPI availability in the past year (Table 1). Compared to schools with advantaged students, moderately advantaged and disadvantaged schools were 51% and 74% less likely respectively to report an MHPI. Schools where mental health issues were perceived as important were 3.6 times more likely to report an MHPI than schools where they were not perceived as important. One indicator of a health-promoting school culture (i.e., parent/community engagement in the school) was positively associated with MHPI availability. In addition, although the confidence intervals did not exclude the null, English schools and schools with high teacher turnover were more likely to report an MHPI.

Table 2. Crude and adjusted odds ratios (OR) and 95% confidence intervals (CI) for the association between availability of mental health-promoting interventions (MHPIs) in the past year and school context characteristics, PromeSS Study, Québec, Canada, 2017-19 (n=171)

	n	MHPI available %	OR <sub>crude</sub> (95% CI)	OR <sub>adj</sub> (95% CI) <sup>a</sup>
Size of community <sup>b</sup>				
Rural (population <30 000)	91	40	ref	ref
Urban (population >30 000)	72	46	1.29 (0.69, 2.42)	0.63 (0.28, 1.42)
Neighborhood social deprivation (Pampalon) <sup>c</sup>				
1 (Least deprived)	33	36	ref	ref
2	35	46	1.47 (0.56, 3.90)	1.90 (0.67, 5.40)
3	32	53	1.98 (0.74, 5.35)	2.16 (0.75, 6.23)

4	32	34	0.92 (0.33, 2.54)	0.82 (0.28, 2.39)
5 (Most deprived)	29	45	1.42 (0.51, 3.94)	1.62 (0.53, 4.97)
Neighborhood material deprivation (Pampalon) <sup>c</sup>				
1 (Least deprived)	18	50	ref	ref
2	27	44	0.80 (0.24, 2.65)	1.10 (0.30, 4.03)
3	35	51	1.06 (0.34, 3.30)	1.65 (0.46, 5.97)
4	36	42	0.71 (0.23, 2.23)	1.35 (0.36, 5.12)
5 (Most deprived)	45	33	0.50 (0.16, 1.52)	1.20 (0.31, 4.62)
Student body socioeconomic status (IMSE)				
Advantaged	35	60	ref	ref
Moderately advantaged	75	44	0.52 (0.23, 1.18)	0.49 (0.21, 1.14)
Disadvantaged	61	30	<b>0.28 (0.12, 0.67)</b>	<b>0.26 (0.10, 0.69)</b>
Language of instruction				
French	141	39	ref	ref
English	30	57	2.05 (0.92, 4.54)	2.27 (0.99, 5.21)
Number of students				
30-149	43	30	ref	ref
150-349	68	46	1.93 (0.86, 4.33)	1.71 (0.74, 3.95)
≥350	59	48	2.08 (0.91, 4.77)	1.58 (0.65, 3.87)
Student/teacher ratio				
<15	51	45	ref	ref
15-18	63	40	0.80 (0.38, 1.69)	0.58 (0.25, 1.35)
>18	55	42	0.88 (0.41, 1.89)	0.71 (0.29, 1.71)
Teacher turnover				
Low	99	37	ref	ref
High	72	49	1.59 (0.86, 2.94)	1.90 (0.98, 3.69)
Principal turnover				
Low	134	41	ref	ref
High	37	46	1.22 (0.59, 2.54)	1.26 (0.58, 2.74)
Percent of students considered at-risk				
< 20	47	49	ref	ref
20-30	64	44	0.81 (0.38, 1.73)	1.11 (0.49, 2.51)
> 30	51	35	0.57 (0.25, 1.28)	0.90 (0.36, 2.23)
Percent of students absent per day				
0-1.99	41	49	ref	ref
2-3.99	81	43	0.80 (0.38, 1.70)	0.75 (0.34, 1.68)
4-14	47	36	0.60 (0.25, 1.40)	0.53 (0.21, 1.40)
No. HPis in school (excluding MHPIs)				
2-6	50	34	ref	ref
7-11	64	48	1.82 (0.85, 3.91)	0.50 (0.22, 1.12)
12-60	57	42	1.41 (0.64, 3.10)	0.82 (0.38, 1.76)
Perceived importance of mental health issues				
Not important	60	23	ref	ref
Important	111	52	<b>3.60 (1.78, 7.28)</b>	<b>2.96 (1.40, 6.25)</b>
Parent/community engagement in school				
1.75-3.50	59	27	ref	ref
3.60-4.00	67	55	<b>3.32 (1.57, 7.01)</b>	<b>3.93 (1.74, 8.86)</b>
4.20-5.00	45	42	1.96 (0.86, 4.48)	1.53 (0.61, 3.81)
School physical environment				
1.17-3.43	67	33	ref	ref
3.50-3.86	51	51	<b>2.13 (1.01, 4.50)</b>	1.92 (0.88, 4.18)
4.00-5.00	53	45	1.69 (0.81, 3.56)	1.32 (0.60, 2.90)
School/teacher commitment to student health				
2.00-3.75	49	39	ref	ref
4.00-4.33	65	42	1.12 (0.53, 2.39)	1.04 (0.46, 2.33)

4.50-5.00	53	43	1.21 (0.55, 2.67)	1.14 (0.49, 2.68)
Ease of principal leadership				
2.57-3.57	36	56	ref	ref
3.71-3.86	41	46	0.69 (0.28, 1.70)	0.87 (0.34, 2.26)
4.00-5.00	60	35	<b>0.43 (0.19, 1.00)</b>	0.45 (0.18, 1.09)

Bolded ORs indicate confidence intervals that do not include the null.

<sup>a</sup>Adjusted with IMSE, language of instruction, and school size. Regression models for IMSE, language of instruction and school size as main variables of interest were only adjusted for the 2 other confounding variables.

<sup>b</sup>N=163 due to missing values.

<sup>c</sup>N=161 due to missing values

## MHPI best practices

Among the 70 schools that offered MHPIs in the past year, 25 schools chose an MHPI to describe in-depth. These 25 MHPIs had been available in study schools a median (IQR) of 2 (2.3) years (range 1-10). Two-thirds were developed *de novo* by school staff. All MHPIs focused on skill development and used active learning strategies. Overall, the 25 MHPIs were perceived to be highly successful (median (IQR) score on a scale of 1-5 = 4.3 (0.9)), and 68% of school informants considered the MHPI to be very permanent within the school. Table S4 provides short narrative descriptions of each MHPI and responses to the in-depth questions.

Each MHPI was categorized according to its “evidence-based content” and “level of adaptation to school context”: (A) high content/high adaptation, (B) high content/low adaptation, (C) moderate content/high adaptation, (D) moderate content/low adaptation, (E) low content/high adaptation, and (F) low content/low adaptation (Table 3). Overall, fewer than half of all MHPIs (n = 11) were classified in the three categories with higher expected effectiveness (A, B, and C).

The most frequently reported implementation best practices included institutionalization (n = 22 of 25 MHPIs) and having a program champion (n = 21 of 25 MHPIs). Four implementation best practices (i.e., training provided for animators, process evaluation, outcome evaluation, implementation by a formal team) were absent in eight or more of the 25 MHPIs. The 11 MHPIs



with higher expected effectiveness (typologies A, B, and C) generally reported more implementation best practices (i.e., mean (SD) number of implementation best practices = 1.72 (1.19)). Only 19 of 88 implementation best practice possibilities across the 11 MHPIs (21.6%) were “red” (i.e., indicating low implementation) in the heat map. The 14 MHPIs with lower expected effectiveness (typologies D and E) reported fewer implementation best practices (i.e., mean (SD) number of implementation best practices = 3.21 (1.76)). A total of 45 of 112 implementation best practice possibilities across the 14 MHPIs (40.2%) were “red” in the heat map.

The “Character Building Program” had the highest rating overall with high content and high adaptation ratings (typology A), as well as one of the MHPIs with the most implementation best practices. Effectiveness was expected to be low for the 14 MHPIs in typologies D and E. In particular, the “Activité physique vs. Estime de soi”, “Méthode 1-2-3”, “Vers le Pacifique” – S2, and “Système D” programs had low ratings for content and for implementation best practices. These MHPIs were generally delivered only once, only to a few grades, and did not incorporate changes to the school environment or participation of families and community partners.

Table 3. Heatmap of 25 mental health-promoting interventions (MHPs) according to content-related, adaptation-related, and implementation best practices, PromeSS Study, Québec, Canada, 2017-19

MHPI	Intervention best practices		Typology	Implementation best practices							
	Content	Adaptation to school context		Guidelines	Training	Process evaluation	Outcome evaluation	Institutionalization	Team	Program champion	Principal involvement
“Character Building Program”	High	High	A (high/high)	X	X	X	X	X	0	X	0
“Petits Cœurs Rieurs”	High	Low	B (high/low)	X	X	X	X	X	X	X	X
“Soutien aux Comportements Positifs (SCP)” – S1	High	Low		X	X	X	X	X	0	X	X
“Vers le Pacifique” – S1	High	Low		0	X	X	X	0	0	X	0
“Anxiété”	Moderate	High	C (moderate/high)	X	0	X	X	X	X	X	X
“Jouer et vivre en harmonie”	Moderate	High		X	X	0	X	X	X	X	X
“Soutien aux Comportements Positifs (SCP)” – S3	Moderate	High		X	X	X	X	X	0	X	X
“Interventions pour contrer l’anxiété”	Moderate	High		X	X	0	X	X	X	X	X
“Stress + Anxiété”	Moderate	High		0	X	X	X	X	0	X	X
“La cantine santé – moments de douceur”	Moderate	High		X	0	0	0	X	X	X	X
“Brigades X”	Moderate	High		X	0	0	X	X	0	X	X
“Classroom Meetings”	Moderate	Low	D (moderate/low)	X	X	0	0	X	X	X	X
“Positive Behavior Program”	Low	High	E (low/high)	X	0	X	X	X	X	X	X
“Médiateurs”	Low	High		X	X	X	X	X	0	X	X
“Soutien aux Comportements Positifs (SCP)” – S2	Low	High		X	X	X	X	X	X	0	X
“Atelier intimidation et prévention”	Low	High		X	0	0	X	X	X	X	X
“Les Politesses Exquises”	Low	High		X	0	X	0	0	X	X	X
“Groupe de bénévoles”	Low	High		X	0	X	0	X	0	X	X
“Stress + Anxiété: Ateliers de la Stagiaire”	Low	High		X	0	X	X	X	0	X	0
“La Méditation”	Low	High		0	X	0	X	X	0	X	X
“Activité de l’estime de soi”	Low	High		0	0	X	0	X	X	X	0
“Activité physique vs. Estime de soi”	Low	High		X	0	0	0	X	X	0	0
“Méthode 1-2-3”	Low	High		X	0	X	0	0	0	X	0
“Vers le Pacifique” – S2	Low	High		0	0	X	0	X	0	0	0
“Système D”	Low	High		0	X	0	0	X	0	0	0

\*MHPs were organized into a typology of six categories: (A) high alignment with Health Promoting Schools principles/high adaptation; (B) high alignment/low adaptation; (C) moderate alignment/high adaptation; (D) moderate alignment/low adaptation; (E) low alignment/high adaptation; and (F) low alignment/low adaptation. See Figures 1 & 2.

X = Implementation practice is present for the HPI; 0 = Implementation practice is not present for the HPI. Color code for alignment with best practice: Green = High; Yellow = Moderate; Red = Low.

## **DISCUSSION**

In this study, we investigated the association between school context and MHPI availability in public elementary schools, and we compared the characteristics of MHPIs offered recently in these schools against evidence-based best practices.

### **School context correlates of MHPI availability**

Aligned with a conceptualization of interventions as events in systems<sup>43</sup> (rather than activities independent of the setting into which they are introduced), our findings support the notion that school context is important for MHPI implementation. Contextual factors important for population health interventions include socio-economic, cultural, environmental, and historical features.<sup>44</sup> Indeed, the possible association between English language of instruction and MHPI availability observed in this study may reflect historical aspects of the Québec school board infrastructure, which has always operated in a dual school system organized by language.<sup>45</sup> Differences in MHPI availability across language likely does not inherently relate to language but rather to processes at the school board level. A recent Québec study reported that a higher proportion of English than French high school students had a diagnosis of depression or anxiety,<sup>46</sup> which could translate into higher awareness of mental health issues in English schools. Further, immigrant children must enroll in French schools in Québec,<sup>47</sup> such that differences in student cultural backgrounds could affect perceptions (e.g., taboos around discussing mental health problems), identification of issues, and level of priority for mental health among staff and students in these schools.

According to the IMSE, a measure of the socioeconomic status of the student body composition, disadvantaged schools were less likely to offer MHPIs.<sup>35</sup> In contrast, there was no association with

the two Pampalon indices which reflect social and material deprivation in the school neighborhood. The IMSE inequalities may relate to known challenges in schools serving disadvantaged students (e.g., increased learning, health and social needs among students; limited financial; material and social resources; dealing with urgent needs)<sup>48-50</sup>. Because mental health is a relatively recent and less prominent public health issue compared to physical activity and healthy eating for example, it is possible that schools serving disadvantaged students are less likely to consider mental health as a priority issue<sup>12</sup> compared to competing issues.<sup>51</sup> Indeed schools where mental health issues were perceived as important were more likely to report an MHPI. Disadvantaged schools may also have more difficulty establishing a health-promoting school culture through engagement with parents and the community<sup>37</sup> (i.e., stakeholders who may be well-positioned to signal emerging health issues to school staff).<sup>52,53</sup> Such inequalities were not observed in our Québec sample of schools for other types of HPIs which fall under ministerial mandates<sup>12</sup> and which have been at the forefront of public health priorities for years.

Despite usually being reported as a barrier to establishing a health-promoting school culture and HPI sustainment,<sup>54,55</sup> teacher turnover was positively associated with MHPI availability. Because mental health promotion has only recently become a mainstream public health concern, it is possible that it interests younger teachers primarily, who are less likely to have permanent positions. The findings may reflect that MHPIs risk disappearing when the teacher or other staff member who acts as the program champion leaves the school.

Finally, schools where mental health issues were perceived as important were more likely to offer MHPIs. This could reflect that school staff in some schools have the time, capacity and resources

to recognize and address important student health issues. In a qualitative study of the acceptability and feasibility of early identification of mental health difficulties in primary schools, teachers felt that they were well positioned to recognize changes in their students' behaviour and emotions.<sup>52</sup> However, despite feeling a responsibility for supporting students' mental health needs, some teachers may not feel adequately knowledgeable or skilled to intervene.<sup>52,56</sup> Implementing mental health training as part of teachers' professional development could increase awareness, knowledge and skills in identifying mental health issues<sup>57</sup> and could better prepare school staff to recognize student needs and implement MHPIs in their school. Alternatively, it may be that implementing a MHPI increases awareness and perceived importance of mental health issues in the school.

### **MHPI best practices**

We estimated the effectiveness 25 MHPIs based on two ratings: (1) how well the content of the MHPI aligned with evidence-based characteristics; and (2) how well-adapted they were to the school context. To validate our exploratory analysis, we juxtaposed our findings to the Health Promoting Schools theoretical framework, which aligned with our measurement of whole-school MHPIs involving families and community organizations.<sup>28,29</sup> Embedded in this approach is the notion of school autonomy to respond to issues specific to their context in ways that are adapted to their context.<sup>30</sup> This lends credibility to our typology and rankings of expected effectiveness, which we developed to characterize MHPIs.

In our sample, many MHPIs were implemented as one-time interventions and involved few changes to the whole-school context. We therefore deemed them unlikely to be very effective based on best practices for MHPI characteristics. A report by the Québec National Public Health

Institute indicated that schools tend to implement one-time health promoting interventions with limited relevance to educational goals, few complementary interventions within the school, and that were highly dependent on a limited number of actors or champions.<sup>58</sup> Yet comprehensive whole-school approaches such as HPS are known to be effective for health promotion, including mental health.<sup>5,6,21,53</sup> Although it is possible that ineffective interventions may still contribute to overall “noise” in the school (i.e., increased awareness), it appears that there is room for improvement in MHPI alignment with HPS principles and evidence-based content, at least in the MHPIs that we investigated.

Additionally, MHPIs with lower expected effectiveness generally adhered to fewer implementation best practices, possibly because small-scale one-time interventions led by a single individual are not perceived to require as much planning. However effective implementation practices are key to integrating MHPIs into the normal school routine, convey intervention goals to staff, encourage whole school commitment, divide labor among multiple individuals, facilitate planning coordinated interventions, and ensure full implementation so that all students benefit.<sup>6,21,22,25,59–61</sup> MHPIs implemented without adherence to evidence-based practices may only produce minimal benefits and they risk being sidelined if a new issue arises or the program champion leaves the school. Schools should be encouraged to align with both a whole-school approach and a coordinated implementation process to increase expected MHPI effectiveness.

Overall, our data suggest a lack of process and outcome evaluation. In general, few school-based HPIs are rigorously evaluated for reasons related to time, resources, and challenges in measuring health outcomes in the short- and long-term.<sup>62</sup> Among the 25 MHPIs in our sample, we found

published evaluations of outcomes for only three interventions (i.e., Petits Coeurs Rieurs; Soutien aux Comportements Positifs; Vers le Pacifique),<sup>59,63</sup> which match with the three interventions categorized as high content/low adaptation. In these cases, implementation guidelines and support may have been provided to schools from the MHPI designers, which may explain why there were few adaptations to the school context. However as noted in other studies, there can be variability in how the same intervention is implemented across schools.<sup>64-66</sup> In our sample for example, similar MHPIs were implemented with different features and implementation practices (i.e., three schools implemented Soutien aux Comportements Positifs and two schools implemented Vers le Pacifique) and therefore ranked differently in terms of expected effectiveness.

There is indeed a risk that changing an evidence-based intervention could denature program elements rendering the intervention effective.<sup>67,68</sup> It may also be difficult for school stakeholders to select interventions compatible with their context and to estimate their likelihood to be effective.<sup>61</sup> Our proposed typology to characterize MHPIs could respond to a need for user-friendly tools to select interventions likely to be effective in a given context.<sup>58</sup> However, more research is needed to understand how effectiveness varies across these categories and whether it is possible to delineate a threshold of what constitutes an “acceptable” MHPI, given that some characteristics could be synergistic and only effective together rather than as independent factors<sup>8</sup>. Despite limited understanding of the relative importance of each factor, this study developed an innovative approach that, if replicated, could help researchers and practitioners estimate intervention effectiveness in situations where comprehensive evaluation is difficult.

## **Limitations**

Limitations of this study include the cross-sectional study design which limits causal inference; the relatively small sample size which limits precision; and the convenience sample of schools (and MHPIs) which could limit generalizability, although characteristics of PromeSS schools resembled those of all elementary schools in Québec. Data were collected from a single informant in each school which may be subject to desirability and recall biases. However, most informants were school principals, who are highly knowledgeable about school context and practices.<sup>69</sup> In addition, they were sent the PromeSS questionnaire in advance so they could consult their staff in preparation for the interview. Limitations specific to the second objective also include that PromeSS data for best practices were selected *post hoc* and did not always match how the practice was measured in other studies.

## **CONCLUSION**

MHPI availability is uneven across schools and availability is associated with the socioeconomic status of the student body and school culture. Among schools with MHPIs, few reported a whole-school approach or incorporated optimization of school culture or environment, which are best practices for effective mental health promotion. Future research should investigate how to strengthen school capacity to implement effective MHPIs; how implementation barriers and facilitators differ across schools serving advantaged and disadvantaged students; and how schools can adapt MHPIs to their specific context while retaining what makes them effective.



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## SUPPLEMENTARY MATERIAL

Table S1. Description of PromeSS study variables including questionnaire item(s), response choices and recoding choices for analysis, PromeSS Study, Québec, Canada, 2017-19

Variable (Cronbach's alpha (if applicable))	Source of information and/or PromeSS question label	Response choices	Responses recoded for analysis
<b>Informant characteristics</b>			
Current position in the school	The participant is...	School principal; School vice-principal; Homeroom teacher; Physical Education Teacher; Other	School principal; vice-principal; teacher
Number of years of experience in current school	How many years have you been working in your school as a...	Less than 1; 1-3; 4-6; 7-9; $\geq 10$	As is
<b>Mental health HPI availability</b>			
Availability of mental health HPIs	In the past year, has your school offered any mental health HPIs in which participation is expected at the group, class, grade, or school-level to address mental health and well-being?	Yes; No As is (number)	As is
<b>School characteristics</b>			
Language of instruction	Data obtained from the Ministère de l'Éducation et de l'Enseignement Supérieur du Québec (MEES)	French; English	As is
Number of students in the school	How many students were registered in your school on September 30 of this school year in kindergarten/1 <sup>st</sup> /2 <sup>nd</sup> /3 <sup>rd</sup> /4 <sup>th</sup> /5 <sup>th</sup> /6 <sup>th</sup> grade?	As is	Total sum split in tertiles: 30-149; 150-349; 350-889
Student/teacher ratio	How many of the following staff members work in your school?	Teachers (full-time)	Divided total number of students in the school by total number of teachers
Proportion of students absent per day	On average, how many students in your school are absent each day? (Does not include late arrivals or early departures).	As is (number)	Divided by total number of students in the school
Proportion of students considered at-risk	How many students in your school are considered at risk or EHDAA (élèves handicapés ou en difficultés d'adaptation ou d'apprentissage)?	As is (number)	As is
Teacher turnover	Indicate your level of agreement. In the past 3 years your school experienced teacher turnover.	Several staff; Some staff; Few staff; No turnover in the past 3 years; No turnover in more than 3 years	Low (Few staff; No turnover in the past 3 years; No turnover in more than 3 years); High (Several staff; Some staff)
Principal turnover	Indicate your level of agreement. In the past 3 years your school experienced principal turnover.	3 in 3 years; 2 in 3 years; 1 in 3 years; in 3 years; 0 in more than 3 years	Low (1 in 3 years; in 3 years; 0 in more than 3 years); High (3 in 3 years; 2 in 3 years)
Total number of other HPIs offered in the school			
Socioeconomic status of the student body	Socioeconomic indicator (IMSE) obtained from the Ministère de l'Éducation et de l'Enseignement Supérieur du Québec (MEES)	1 (most advantaged) to 10 (least advantaged)	Advantaged (IMSE indicator between 1-3); Moderately advantaged (IMSE indicator between 4-

			7); Disadvantaged (IMSE indicator between 8-10).
Perceived importance of mental health issues at school	In the past year, how important was each of the following health issues for your Grade 5 and 6 students? Problems with mental health (e.g. anxiety)	Extremely important; very important; important; not very important; not at all important	Important (Extremely important, very important, important); Not important (not very important, not at all important)
Parent/community engagement in school ( $\alpha=0.7$ )	Indicate your level of agreement. In your school... (i) meetings with teachers are well attended by parents, (ii) parents attend school-sponsored events, (iii) PPO (Parent Participation Organization) or Home & School meetings are well attended by parents, (iv) parent volunteers are easy to recruit, (v) community partners (e.g., community organizations, etc.) are involved in the planning and implementation of joint activities or interventions.	1.Strongly disagree; 2. Disagree; 3. Neither agree or disagree; 4. Agree; 5. Strongly agree	Responses were summed and divided by the number of items responded to, to create a mean score
School physical environment ( $\alpha=0.6$ )	Indicate your level of agreement. In your school... (i) area provided for eating meals is pleasant and inviting, (ii) food distribution (including cafeteria, daycare, outside food suppliers, nutritional support programs) prioritizes foods of good nutritional value, (iii) measures are in place to foster active transportation (e.g. crossing guards, secure bike racks, etc.), (iv) physical activity is provided on all days when there is no physical education class to all students (not including activities during lunch, recess or before/after school), (v) indoor facilities for physical education, extracurricular, and other physical activities meet the needs of all students, (vi) outdoor facilities for physical education, extracurricular, and other physical activities meet the needs of all students, (vii) indoor school physical activity facilities are available to all students outside the class timetable, (viii) outdoor school physical activity facilities are available to all students outside the class timetable, (ix) access to indoor and outdoor facilities for physical education, extracurricular and other physical activities belonging to other schools or community/private organizations is available to all students (does not include municipal parks).	1.Strongly disagree; 2. Disagree; 3. Neither agree or disagree; 4. Agree; 5. Strongly agree	Responses were summed and divided by the number of items responded to, to create a mean score
School/teacher commitment to student health ( $\alpha=0.7$ )	Indicate your level of agreement. (i) the amount of emphasis on health promotion in your school's educational project is sufficient, (ii) teachers in your school are innovative, always seeking out new ways to facilitate students' progress, (iii) teachers in your school have a real interest in the health of the students, (iv) teachers in your school are committed to promoting healthy behaviours in their students.	1.Strongly disagree; 2. Disagree; 3. Neither agree or disagree; 4. Agree; 5. Strongly agree	Responses were summed and divided by the number of items responded to, to create a mean score
Ease of principal leadership ( $\alpha=0.8$ )	Indicate the level of difficulty. In this school how difficult is it for the principal to... (i) demonstrate leadership for change, (ii) establish a climate of openness to innovation, (iii) ensure that instructional goals are clearly communicated to everyone, (iv) securing resources for health-promoting interventions, (v) foster respect, (vi) establish a safe and orderly school environment, (vii) guide the staff in the process of solving problems.	1.Strongly disagree; 2. Disagree; 3. Neither agree or disagree; 4. Agree; 5. Strongly agree	Responses were summed and divided by the number of items responded to, to create a mean score
<b>Specific HPI in-depth variables</b>			



Health topics the HPI was designed to address	What aspect(s) of your students' health and wellbeing does (name of intervention) primarily address? 1) smoking prevention; 2) tobacco control education; 3) aggressive behaviour; 4) mental health (e.g. anxiety); 5) bullying (may include cyberbullying); 6) physical activity; 7) healthy eating; 8) addiction prevention (e.g. alcohol, drugs, gambling); 9) personal hygiene; 10) puberty; 11) personal safety and injury prevention; 12) oral health; or other	No; Yes (for each)	As is
Number of years offered	Is (name of intervention) currently being offered at your school? If not, what year was (name of intervention) last offered to students?  If yes, how long has (name of intervention) been offered in your school?	Yes/No 1. 2016-17; 2. 2015-16; 3. 2014-15; 4. 2013-14; 5. 2017-18 As is (years)	Number of years HPI available at the school; Number of years since HPI was first offered As is (years)
Intervention developer	Who originally designed (name of intervention)?	School principal; Vice principal; Homeroom teacher(s) in your school; Other teacher(s) in your school; Professional staff member(s) in your school; Internal group; Schoolboard (educational services, student services); University-based researcher or research team; Provincial Ministry; CISSS/CIUSSS (Centre intégré de santé et de services sociaux/Centre intégré universitaire de santé et de services sociaux); Community organization; Not-for-profit organization; For-profit organization; Other	Developer (School principal; Vice principal; Homeroom teacher(s) in your school; Other teacher(s) in your school; Professional staff member(s) in your school; Internal group; Other) Adopter (Schoolboard (educational services, student services); University-based researcher or research team; Provincial Ministry; CISSS/CIUSSS (Centre intégré de santé et de services sociaux/Centre intégré universitaire de santé et de services sociaux); Community organization; Not-for-profit organization; For-profit organization; Other)
Sequenced step-by-step program	(Name of intervention) was a... 1) special event (e.g. health fair, guest speaker at an assembly, etc.) (specify); 2) pedagogical activity; 3) learning and evaluation situation; 4) program (specify); 5) other (specify)	No; Yes (for each)	Yes (program); No (special event, pedagogical activity, learning and evaluation situation, other)
Active forms of learning	What type of learning strategy was used for (name of intervention)? Check all that apply. 1) Lecture strategies: presentations, demonstrations; 2) Individual work: independent practice; 3) Interactive teaching strategies: group discussion, role-play, modeling; 4) Social constructivist teaching strategies: peer education, tutoring, collaborative and cooperative learning; 5) Other (specify).	No; Yes (for each)	Active (interactive, social constructivist); Inactive (lecture, individual)

Skill development	Were any of the following core competencies incorporated into ( <i>name of intervention</i> )? Check all that apply. 1) self-esteem; 2) managing emotions and stress; 3) positive interactions with others; 4) self-awareness; 5) learning to say 'no'; 6) asking for help; 7) informed lifestyle choices; 8) adoption of prosocial choices; 9) management of prosocial choices; 10) social engagement; 11) other (specify).	No; Yes (for each)	As is
Whole school approach (targeting all grades)	Which grade(s) received (name of intervention)?	No; Yes (for each grade)	Yes (all grades received intervention); No
Whole school approach (changes to school culture and environment)	Were there any other initiatives occurring in your school before or around the same time as (name of intervention) that addressed the same health and wellbeing issue as (name of intervention)? Check all that apply. 1) media campaign, 2) assemblies, 3) extra-curricular activities, 4) linking to services offered by external organization, 5) infrastructure, 6) social environment, 7) school policy, 8) school day care service activities, 9) special events.	No; Yes (for each)	Yes (at least one); No (none)
Family involvement	Were the following members of the school community included in (name of intervention): Families (invited to participate).	No; Yes	As is
Delivery by in-school animators	(Name of intervention) animators were... Check all that apply.	Homeroom teachers; Other teachers; Student-peers; School health professionals (e.g. nurse, dental hygienist, etc.); External health professionals (e.g. physician); Members of a community organization; CEGEP or university students; Other (specify)	Internal to the school (Homeroom teachers; Other teachers; Student-peers; School health professionals); External to the school (External health professionals (e.g. physician); Members of a community organization; CEGEP or university students)
Coordination team for implementation	Who was responsible for planning how (name of intervention) would be implemented in the first year?	A team composed of members of the school staff; A team composed of members of the school staff and a partner organization; School principal; Vice principal; Homeroom teacher; Other teacher; External agency; (Name of intervention) developers; Other (specify)	Yes (team); No
Guidelines for implementation	Indicate your level of agreement: (The implementation team/the individuals who were responsible for planning the implementation) developed a written plan to facilitate implementation.	1.Strongly disagree; 2. Disagree; 3. Neither agree or disagree; 4. Agree; 5. Strongly agree	Yes (Agree; Strongly agree); No (Strongly disagree; Disagree; Neither agree or disagree)
Training for implementation and delivery	Indicate your level of agreement. Prior to implementing (name of intervention), training was provided to animators.	1.Strongly disagree; 2. Disagree; 3. Neither agree or disagree; 4. Agree; 5. Strongly agree	Yes (Agree; Strongly agree); No (Strongly disagree; Disagree; Neither agree or disagree)
Intervention leader	Was there someone who advocated strongly for the intervention and supported its implementation despite barriers?	No; Yes	As is
Support from school principal	What was your role during the implementation of (name of intervention)? Indicate all that apply.	Animator delivering the intervention to students; member of the implementation team; leader of the implementation team; no direct role during the implementation.	Yes (member of the implementation team; leader of the implementation team); No

Ability to solve problems during implementation	Indicate your level of agreement: (the implementation team/the individuals who were responsible for planning the implementation) solved critical implementation issues.	1.Strongly disagree; 2. Disagree; 3. Neither agree or disagree; 4. Agree; 5. Strongly agree	Yes (Agree; Strongly agree); No (Strongly disagree; Disagree; Neither agree or disagree)
Adaptations to tailor HPI	Prior to implementation, did your school make any modifications to (name of intervention)?  Did (name of intervention) change during its implementation? (Name of intervention)...	1) No modifications were made: it could be used as is; 2) No modifications were made: it was already tailored to our school; 3) No modifications were made: other reason; 4) Yes, minor modifications; 5) Yes, major modifications; 6) Yes, but don't know if they were major or minor modifications; 7) Don't know. An external agency implemented the intervention in our school.  1)Did not change at all ;2) Underwent minor modifications ;3) Underwent major modifications ;4) Changed completely ;5) Don't know. An external agency implemented the intervention in our school	1-3, 7 = No 4-6 = Yes  1, 5=no 2-4=yes
Evaluation of implementation process	Did your school do any of the following to evaluate (name of intervention)? Document the extent to which implementation was carried out in accordance with the plan; Document the barriers and facilitators to implementation.	No; Yes	As is
Evaluation of program outcomes	Did your school do any of the following to evaluate (name of intervention)? Formally evaluate the outcomes of the (name of intervention).	No; Yes	As is
Institutionalization	Is the intervention explicitly written in your school's orientation plan (e.g., the educational project, the success plan or others)?	No; Yes	As is
Perceived success	Indicate your level of agreement. In this school... (i) (intervention) met all objectives; (ii) abandoning (intervention) had/would have a negative effect on the students; (iii) (intervention) had a positive impact on students; and (iv) animators enjoyed working on (intervention).	1.Strongly disagree; 2. Disagree; 3. Neither agree or disagree; 4. Agree; 5. Strongly agree	Responses were summed and divided by the number of items responded to, to create a mean score for perceived HPI success.
Perceived permanence	How permanent do you think the intervention is at your school?!	Very permanent; moderately permanent; not at all permanent	Very permanent/Moderately permanent; Not at all permanent

Table S2. Case-ordered descriptive matrix of best practice characteristics for 25 mental health promoting interventions in order of number of best practices fulfilled, PromeSS Study, Québec, Canada, 2017-19

Mental health-promoting intervention	Active forms of learning	Skill development	Program	All grades	Changes to whole-school	Community partners	Families	Internal animator	Adaptations	Developed	Implementation guidelines	Training	Process evaluation	Outcome evaluation	Institutionalization	Implementation team	Champion	Principal support
“Petits Cœurs Rieurs”	X	X	X	0	X	X	X	0	X	0	X	X	X	X	X	X	X	X
“Soutien aux Comportements Positifs (SCP)” – S1	X	X	X	X	X	X	X	X	0	0	X	X	X	X	X	0	X	X
“Interventions pour contrer l’anxiété”	X	X	0	X	0	X	X	X	X	X	X	X	0	X	X	X	X	X
“Character Building Program”	X	X	X	X	X	X	0	X	X	0	X	X	X	X	X	0	X	0
“Anxiété”	X	X	X	X	0	X	0	X	0	X	X	0	X	X	X	X	X	X
“Jouer et vivre en harmonie”	X	X	X	X	0	X	0	0	X	X	X	X	0	X	X	X	X	X
“Soutien aux Comportements Positifs (SCP)” – S3	X	X	X	X	0	X	0	X	X	0	X	X	X	X	X	0	X	X
“Stress + Anxiété”	X	X	X	0	0	X	X	X	X	X	0	X	X	X	X	0	X	X
“Positive Behavior Program”	X	X	X	X	0	0	0	X	X	X	X	0	X	X	X	X	X	X
“Médiateurs”	X	X	X	X	0	0	0	X	X	X	X	X	X	X	X	0	X	X
“Soutien aux Comportements Positifs (SCP)” – S2	X	X	X	X	0	0	0	X	X	X	X	X	X	X	X	X	0	X
“La cantine santé – moments de douceur”	X	X	X	X	0	X	0	X	X	X	X	0	0	0	X	X	X	X
“Atelier intimidation et prévention”	X	X	0	0	X	X	0	X	X	X	X	0	0	X	X	X	X	X
“Vers le Pacifique” – S1	X	X	X	X	X	X	X	X	0	0	0	X	X	X	0	0	X	0
“Brigades X”	X	X	X	X	X	0	0	0	X	X	X	0	0	X	X	0	X	X
“Classroom Meetings”	X	X	X	X	X	0	0	X	0	0	X	X	0	0	X	X	X	X
“Groupe de bénévoles”	X	X	0	0	X	X	0	X	X	X	X	0	X	0	X	0	X	X
“Les Politesses Exquises”	X	X	X	X	0	0	0	X	0	X	X	0	X	0	0	X	X	X
“Activité de l’estime de soi”	X	X	X	0	0	X	0	X	X	X	0	0	X	0	X	X	X	0
“La Méditation”	X	X	0	0	0	0	0	X	X	X	0	X	0	X	X	0	X	X
“Stress + Anxiété: Ateliers de la Stagiaire”	X	X	0	0	0	0	0	X	0	X	X	0	X	X	X	0	X	0
“Méthode 1-2-3”	X	X	0	0	X	0	X	X	X	0	X	0	X	0	0	0	X	0
“Activité physique vs. Estime de soi”	X	X	0	0	0	0	0	0	X	X	X	0	0	0	X	X	0	0
“Système D”	X	X	0	0	0	X	0	X	X	0	0	X	0	0	X	0	0	0
“Vers le Pacifique” – S2	X	X	0	0	0	0	0	X	X	0	0	0	X	0	X	0	0	0

X (green) = Best practice characteristic was present for the HPI; 0 (red) = Best practice characteristic was not present for the HPI

Table S3. Scoring for rank attribution according to evidence-based content and adaptation to school context

	Number of best practice characteristics	Ranking
Evidence-based intervention content (program, offered to whole school, complementary changes to school environment, involvement of family, involvement of community)	4-5	High
	3	Moderate
	0-2	Low
Adaptation to school context (developed by the school, modified prior to or during implementation, delivered by in-school animators)	2-3	High
	0-1	Low

Table S4. Description and characteristics of each of the 26 mental health promoting interventions investigated in this current study, PromeSS Study, Québec, Canada, 2017-19 (n=26)

	Number of years offered	Design of the intervention	Health topics addressed	Grades targeted	Program or one-time event	Competencies	Learning strategies	Animators	Partners <sup>i</sup>	Complementary MH initiatives	Perceived success	Perceived permanence	Institutionalization (Intervention explicitly written in school orientations)
HPI 1: “Petits Cœurs Rieurs”	Description: Management of emotions. Offered to 1st and 2 <sup>nd</sup> grade students to learn to verbalize emotions. Teaching is done through storytelling, bracelets labeled with different emotions given to the students, and magic wands.												
	Offered for 3 years	Adopted from external organization	Aggressive behaviour; Mental health; Bullying	1 <sup>st</sup> & 2 <sup>nd</sup> grade	Program	Self-esteem; Managing emotions and stress; Positive interactions with others; Self-awareness; Adoption of prosocial behaviors	Lecture, interactive, social constructivist learning strategies	External animators	<b>Fondation Les Petits Cœurs</b> (Non-profit organization and Designer of the intervention); Other elementary school	Media campaign (press conference, posters), policy (success plan)	4/5	Moderately sustainable	Institutionalized
HPI 2: “Vers le Pacifique” – S1	Description: Two-part program developed by L’Institut Pacifique <sup>i</sup> , a community-based charitable organization dedicated to the development, implementation and promotion of conflict resolution and psychosocial prevention skills to build violence-free environments and support the psychosocial development of children, youth and adults. The first part of the program consists of workshops for conflict resolution by promoting peaceful conduct, offered to elementary school students of all levels and accompanied by an implementation guide for the school. The second part of the program consists of workshops for peer mediation by promoting student competencies for mediation as an alternative to unsuccessful approaches to conflict resolution, offered to 4 <sup>th</sup> , 5 <sup>th</sup> and 6 <sup>th</sup> grade students.												
	Offered for 3 years	Adopted from external organization	Aggressive behaviour; Mental health; Bullying	All grades	Program	Self-esteem; Managing emotions and stress; Positive interactions with others; Self-awareness; Learning to say “no”; Asking for help; Making	Lecture, social constructivist learning strategies	Internal animators	<b>Jeunesse Ensemble</b> (Community organization)	Infrastructure changes	4.33/5	Moderately sustainable	Not institutionalized

						informed lifestyle choices; Management of social influences							
HPI 3: "Jouer et vivre en harmonie"	Description: Developed by special educators and inspired by an existing intervention. Educates about healthy lifestyles and the need to play together to adopt pro-social behaviors.												
	Offered for 2 years	Developed by the school	Aggressive behaviour; Mental health; Bullying; Physical activity; Healthy eating; Puberty; Personal safety and injury prevention; Healthy lifestyle habits	All grades	Program	Self-esteem; Managing emotions and stress; Positive interactions with others; Self-awareness; Learning to say "no"; Asking for help; Making informed lifestyle choices; Adoption of prosocial behaviors; Management of social influences	Social constructivist learning strategies	External animators	<b>Institut Pacifique</b> (Community organization); Fondation Jasmin Roy (Non-profit organization)	No other complementary mental health initiatives in the school	5/5	Very sustainable	Institutionalized
HPI 4: "Activité physique vs. Estime de soi"	Description: Intervention offered to students with behavioral and self-esteem difficulties. Weekly meeting with the physical education teacher to do sports activities and outreach.												
	Offered for 1 year	Developed by the school	Aggressive behaviour; Physical activity; Healthy eating; Personal safety and injury prevention; Behavioral difficulties	1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> & 5 <sup>th</sup> grades	Not a program (Pedagogical activity)	Self-esteem; Managing emotions and stress; Positive interactions with others; Making informed lifestyle choices; Adoption of prosocial behaviors	Interactive, social constructivist learning strategies	External animators	No partner	Extracurricular activities (School run); Special event (Attendance expected for the Relay for Life)	4.33/5	Not at all sustainable	Institutionalized

HPI 5: "Système D"	Description: Developed by the public health branch of the regional Health and Social Services Agency jointly with the school community, this program of skill-building activities focuses on risk and protective factors common to substance abuse (tobacco, alcohol and other drugs) and gambling prevention). Four in-class workshops are offered to 6 <sup>th</sup> grade students by the teacher and a professional staff (e.g., school nurse, psychosocial counsellor, speaker from a community organization) to help develop personal and social skills, such as assertiveness, resistance to pressure, stress management and problem solving.												
	Offered for 6 years	Adopted from external organization	Addiction prevention; Healthy lifestyle habits	6 <sup>th</sup> grade	Not a program (Learning and evaluation situation)	Self-esteem; Managing emotions and stress; Positive interactions with others; Self-awareness; Learning to say "no"; Asking for help; Making informed lifestyle choices; Adoption of prosocial behaviors; Management of social influences	Lecture, social constructivist learning strategies	Both internal and external animators	Integrated health and social services centre (CISSS/CIUSSS) <sup>iii</sup>	No other complementary mental health initiatives in the school	3.67/5	Very sustainable	Institutionalized
HPI 6: "Positive Behavior Program"	Description: Developed by the school and adapted from an intervention previously developed by the school that teachers had difficulty implementing. Intervention to counter bullying and encourage pro-social behaviour with monthly themes. Students in the whole school (kindergarten to 6 <sup>th</sup> grade) are divided into 8 color-coded teams and accumulate tokens for good behaviors. At the end of the month, the three winning teams get a prize (e.g., extra 10 minutes of physical activity, hot chocolate).												
	Offered for 3 years	Developed by the school	Aggressive behaviour; Mental health; Bullying; Physical activity; Personal safety and injury prevention	All grades	Program	Self-esteem; Managing emotions and stress; Positive interactions with others; Self-awareness; Learning to say "no"; Asking for help; Making informed lifestyle	Lecture, interactive, social constructivist learning strategies	Internal animators	No partner	Other HPI	5/5	Very sustainable	Institutionalized



						choices; Adoption of prosocial behaviors; Managem ent of social influences; Social engagemen t							
HPI 7: "Classroom Meetings"	Description: After doing a survey with all students, they decided to do short 10-15 min meetings in the classroom about 2-3 times a week, to discuss about bullying and well-being. The discussion groups are based on the Olweus bullying prevention program <sup>iv</sup> .												
	Offered for 1 year	Adopted from external organizat ion	Aggressive behaviour; Mental health; Bullying; Personal safety and injury prevention	All grades	Program	Self- esteem; Managing emotions and stress; Positive interactions with others; Self- awareness; Learning to say "no"; Asking for help; Making informed lifestyle choices; Adoption of prosocial behaviors; Managem ent of social influences; Social engagemen t	Interactive learning strategies	Both internal and external animators	No partner	Monthly thematic school assemblies (e.g., prosocial behaviors, friendship); Extracurric ular activity ("Running bullying into the ground"); Linking to services offered by external organizatio n (Integrated health and social services center, mental health hospital); Social environmen t (Increase surveillanc e/Active monitoring) ; School policy (Anti-	3/5	Moderately sustainable	Institutiona lized

										bullying anti-violence + Code of conduct); School day care service activities (Training on violence & bullying); Special events (Health Promoting interventions: Day of Pink, anti-bullying week)				
HPI 8: "Activité de l'estime de soi"	Description: Workshops and discussions throughout the school year for 5th and 6 <sup>th</sup> grade students, meeting with boys and girls separately. The goal is to prepare for high school.													
	Offered for 8 years	Developed by the school	Mental health; Personal hygiene; Puberty	5 <sup>th</sup> & 6 <sup>th</sup> grade	Program	Self-esteem; Managing emotions and stress; Positive interactions with others; Self-awareness; Management of social influences; Social engagement	Interactive learning strategies	Internal animators	<b>Integrated health and social services centre (CISSS/CIUSSS)</b>	No other complementary mental health initiatives in the school	3.75/5	Very sustainable	Institutionalized	
HPI 9: "Les Politesses Exquises"	Description: Developed by the school committee on violence and bullying in October 2017. Every month, the students, with the help of teachers, display banners with messages that promote politeness through a classification of 8 types of common polite behaviors. Then, the students send in video clips that are shown in classrooms so that everyone can see the progress of the implementation of these polite behaviors. A tree represents the rewards given to students in terms of tree branches (gift cards): 3 times a year, 4 certificates or "golden branches" are given to 4 students per class, and 3 times a year, each specialized teacher gives one branch per class.													
	Offered for 1 year	Developed by the school	Aggressive behaviour; Bullying; Personal safety and	All grades	Program	Self-esteem; Positive interactions with others; Self-	Interactive, social constructivist learning strategies	Internal animators	No partner	No other complementary mental health initiatives	4.25/5	Very sustainable	Institutionalized	

			injury prevention			awareness; Adoption of prosocial behaviors; Management of social influences				in the school			
HPI 10: “La cantine santé – moments de douceur”	Description: Developed by a special education technician at the school in 2010. Every two weeks, students are selected in small groups (5-6 students) to cook healthy meals under supervision by the special education technician and then distribute the meals in classes. The major focus of the intervention is anxiety management, creating a quiet time for students to escape the stress and talk to the technician if they want to.												
	Offered for 8 years	Developed by the school	Mental health; Healthy eating	All grades	Program	Self-esteem; Managing emotions and stress; Positive interactions with others; Self-awareness; Learning to say “no”; Asking for help; Making informed lifestyle choices; Adoption of prosocial behaviors; Management of social influences; Social engagement	Social constructivist learning strategies	Both internal and external animators	<b>Integrated health and social services centre (CISSS/CIUSSS),</b> Grocery store	No other complementary mental health initiatives in the school	4/5	Very sustainable	Institutionalized
HPI 11: “Anxiété”	Description: Each class receives workshops designed to help all students deal with their anxiety. Workshops are delivered by teachers during class time, but outside of the classroom.												
	Offered for 2 years	Developed by the school	Mental health	All grades	Program	Self-esteem; Managing emotions and stress; Self-awareness; Making informed lifestyle choices	Lecture, interactive learning strategies	Internal animators	<b>Integrated health and social services centre (CISSS/CIUSSS)</b>	Students with high anxiety are identified and provided targeted workshops in smaller groups with a social	4.25/5	Very sustainable	Institutionalized

										worker. Their parents are also invited to and also participate in these latter workshops			
HPI 12: "Brigades X"	Description: Around 20 volunteer 5 <sup>th</sup> and 6 <sup>th</sup> grade students are trained in conflict resolution. On a rotating basis, they are located in the schoolyard during recess and lunch breaks. They carry conflict resolution tools and walkie-talkies to communicate with each other and with adult supervisors as needed.												
	Offered for 1 year	Developed by the school	Aggressive behaviour; Bullying	All grades	Program	Self-esteem; Managing emotions and stress; Positive interactions with others; Self-awareness; Learning to say "no"; Asking for help; Adoption of prosocial behaviors; Management of social influences	Lecture, interactive, social constructivist learning strategies	External animators	<b>Other high school</b>	Social env (Behavior management procedure and + social skills group)	3.75/5	Very sustainable	Institutionalized
HPI 13: "Méthode 1-2-3"	Description: Positive affirmation method and violence prevention for students. Professionals provide 3-4 workshops per year that include presentations and role playing, modeling. Professionals have also provided training for staff to apply the concepts with students beyond the activity.												
	Offered for 1 year	Adopted from external organization	Aggressive behaviour; Bullying; Personal safety and injury prevention	Kindergarten, 1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> , and 5 <sup>th</sup> grades	Not a program (Lecture and participatory activity)	Self-esteem; Managing emotions and stress; Positive interactions with others; Learning to say "no"; Asking for help; Adoption of prosocial behaviors;	Interactive learning strategies	Internal animators	No partner	School policy (Code of conduct); Social skills workshops for some students	4/5	Moderately sustainable	Not institutionalized

						Management of social influences; Social engagement							
HPI 14: "Atelier intimidation et prévention"	Description: Workshops offered in classrooms and to targeted students to prevent violent play, aggressive behavior and bullying. Includes presentations and structured games. Offered by the school special education technician.												
	Offered for 1.5 years	Developed by the school	Aggressive behaviour; Bullying; Personal safety and injury prevention	1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> , 5 <sup>th</sup> & 6 <sup>th</sup> grades (not kindergarten)	Not a program (Pedagogical activity)	Self-esteem; Positive interactions with others; Self-awareness; Learning to say "no"; Asking for help; Making informed lifestyle choices; Adoption of prosocial behaviors; Management of social influences	Lecture, interactive learning strategies	Internal animators	<b>Other elementary school,</b> Local municipality, Police department	Social env (Monitoring in school yard during recess); School policy (Anti-Violence & Anti-Bullying Plan)	4.25/5	Very sustainable	Institutionalized
HPI 15: "Médiateurs"	Description: Students in 5 <sup>th</sup> and 6 <sup>th</sup> grade are chosen to be mediators and receive training in conflict resolution from the psychoeducator. They walk around the school yard at lunchtime and at recess to help students with conflicts or disputes and explain how to play well and live together in harmony.												
	Offered for 2 years	Developed by the school	Bullying; Personal safety and injury prevention	All grades	Program	Self-esteem; Managing emotions and stress; Positive interactions with others; Learning to say "no"; Asking for help; Adoption of prosocial behaviors; Management of social	Interactive learning strategies	Internal animators	No partner	Classroom instruction; Psycho-educational services	3.5/5	Moderately sustainable	Institutionalized

						influences; Social engagement t							
HPI 16: "Character Building Program"	Description: Based on 6 pillars: Trustworthiness, Citizenship, Respect, Responsibility, Fairness, and Caring. Capsules on character building are shown in class (videos, literature, discussions) to all students.												
	Offered for 3 years	Adopted from external organizat ion	Aggressive behaviour; Mental health; Bullying; Personal hygiene; Puberty; Personal safety and injury prevention	All grades	Program	Self- esteem; Managing emotions and stress; Positive interactions with others; Self- awareness; Learning to say "no"; Asking for help; Making informed lifestyle choices; Adoption of prosocial behaviors; Managemen t of social influences; Social engagemen t	Interactive, social constructivi st learning strategies	Internal animators	<b>School board,</b> Other elementary school, Fondation Jasmin Roy (Non-profit organizatio n)	Media campaign (posters); School assembly (Pink Shirt Day); Extracurric ular activities (Leadership , Student Coalition); Social environmen t (by the principal); School policy (Anti- bullying); Special event (Pink t-shirt day for bullying ); "Tell them for me" Survey (grades 4-5- 6); Second Step Program	4.5/5	Very sustainable	Institutiona lized
HPI 17: "Vers le Pacifique" - S2	Description: Program developed by L'Institut Pacifique <sup>b</sup> , a community-based charitable organization dedicated to the development, implementation and promotion of conflict resolution and psychosocial prevention skills to build violence-free environments and support the psychosocial development of children, youth and adults.												
	Offered for 1 years0	Adopted from external organizat ion	Aggressive behaviour; Conflict resolution; Empathy	Kindergarte n	Not a program (Pedagogic al activity)	Self- esteem; Managing emotions and stress; Positive interactions with others;	Lecture, individual work, interactive learning strategies	Internal animators	No partner	No other complemen tary mental health initiatives in the school	4.75/5	Very sustainable	Institutiona lized

						Self-awareness; Asking for help; Making informed lifestyle choices; Adoption of prosocial behaviors							
HPI 18: "Soutien aux Comportements Positifs (SCP)" – S1	Description: Developed by Steve Bissonnette's research team <sup>1</sup> . Approach that teaches positive behaviors. System of emulation rather than reprimands. When a student reproduces the desired positive behaviour, he or she receives a "Céfort" (a little man in the shape of a drop). Students get individual privileges after 4 "Céfort"; the whole class gets a privilege activity after a certain number (may happen about once a month); and the whole school has a celebration after 40 classroom celebrations (happens about 3 times a year).												
	Offered for 6 years	Adopted from external organization	Aggressive behaviour; Mental health; Bullying	All grades	Program	Self-esteem; Managing emotions and stress; Positive interactions with others; Self-awareness; Learning to say "no"; Asking for help; Making informed lifestyle choices; Adoption of prosocial behaviors; Management of social influences; Social engagement	Interactive learning strategies	Internal animators	Designer of the intervention, School board	School policy (Anti-Violence & Anti-Bullying Plan); Family system (positive and repressive, but program was withdrawn) ; Time out room	4.75/5	Very sustainable	Institutionalized
HPI 19: "Soutien aux Comportements Positifs (SCP)" – S2	Description: Positive teaching system and expected behaviors. Modeling, re-practicing, reinforcing positive behaviors. Implemented through a positive reward system in the school and during class time.												
	Offered for 1 year	Developed by the school	Aggressive behaviour; Bullying; Personal hygiene;	All grades	Program	Self-esteem; Managing emotions and stress;	Lecture, individual work, interactive, social	Internal animators	No partner	Health promoting intervention ("Vers le Pacifique")	4/5	Very sustainable	Institutionalized

			Respect for self and others; Responsibility; Commitment and success			Positive interactions with others; Self-awareness; Learning to say “no”; Asking for help; Making informed lifestyle choices; Adoption of prosocial behaviors; Social engagement	constructivist learning strategies			; Social skills workshops for some students			
HPI 20: “Soutien aux Comportements Positifs (SCP)” – S3	Description: Developed by Steve Bissonnette's research team*: an approach that teaches positive behaviours. Posters in various locations throughout the school (e.g., classroom, stairwell, schoolyard) indicate positive behaviours for students to adopt. These behaviours are introduced to students in class at the beginning of the year and reinforced by teachers, educators, bus drivers, etc. After 6 verbal commendations, the student receives a star. Accumulation of stars leads to celebrations (awards) at the individual, classroom and school level. Based on the 3 SCP school values: respect, responsibility and effort.												
	Offered for 4 years	Adopted from external organization	Aggressive behaviour; Bullying; Personal safety and injury prevention; Respect and acceptance of differences	All grades	Program	Self-esteem; Managing emotions and stress; Positive interactions with others; Making informed lifestyle choices; Adoption of prosocial behaviors; Management of social influences	Lecture, interactive learning strategies	Internal animators	<b>School board (special education counsellor)</b> , Designer of the intervention	No other complementary mental health initiatives in the school	4.75/5	Very sustainable	Institutionalized
HPI 21: “La Méditation”	Description: Meditation and mindfulness activity. This activity is supported by a university researcher. They offered training to the teachers, but it was the teachers who set up and implemented these workshops. At the end of the two recesses of the day, students engage in a 4-5 minute meditation session, before starting class.												
	Offered for 3 years	Developed by the school	Mental health; Relaxation	2 <sup>nd</sup> grade	Not a program (Pedagogical activity)	Managing emotions and stress;	Interactive learning strategies	Internal animators	<b>School board</b>	Media campaign (Flyers for parents on	4/5	Moderately sustainable	Institutionalized



						Self-awareness				assessment anxiety)				
HPI 22: “Interventions pour contrer l’anxiété”	Description: During class time, teachers practice yoga, relaxation methods, play relaxing music, and other activities to reduce anxiety and relax. Teachers sometimes use phone apps as a tool. Special education technician also offers some of these workshops.													
	Offered for 2 years	Developed by the school	Mental health; Bullying	All grades	Not a program (Pedagogical activity)	Self-esteem; Managing emotions and stress; Management of social influences	Lecture, individual work, interactive learning strategies	Internal animators	<b>Integrated health and social services centre (CISSS/CIUSSS)</b>	No other complementary mental health initiatives in the school	4.25/5	Very sustainable	Institutionalized	
HPI 23: “Groupe de bénévoles”	Description: Students grades 3-6 are invited to be part of a volunteer group, which aims to improve the social health, behaviours, and caring of students in the school. Specific activities are also conducted with the whole school.													
	Offered for 2 years	Developed by the school	Social health	3 <sup>rd</sup> , 4 <sup>th</sup> , 5 <sup>th</sup> & 6 <sup>th</sup> grade	Not a program (Special event, activity for promotion and awareness)	Self-esteem; Positive interactions with others; Self-awareness; Adoption of prosocial behaviors; Social engagement	Interactive, social constructivist learning strategies	Internal animators	<b>School board;</b> Espace Châteauguay (Community organization)	Extracurricular activities; Social environment; School policy (Educational project)	4.75/5	Very sustainable	Institutionalized	
HPI 24: “Stress + Anxiété”	Description: Activity based on the work of Sonia Lupien (neuroscience researcher) to create a program to combat stress and anxiety in the school, among both students and staff. The program includes classroom presentations, video clips, and practice during peaceful or stressful moments (e.g. before vaccination). The activity focuses on the physical symptoms of stress, methods of coping, and attempts to put stress into perspective (“why I feel stressed and what can I do”). Activity is done at all levels.													
	Offered for 2 years	Developed by the school	Mental health	Kindergarten, 1 <sup>st</sup> & 2 <sup>nd</sup> grade	Program	Managing emotions and stress; Self-awareness; Asking for help; Social engagement	Interactive learning strategies	Both internal and external animators	<b>Team of four special education technicians</b>	No other complementary mental health initiatives in the school	5/5	Very sustainable	Institutionalized	
HPI 25: “Stress + Anxiété : Ateliers de	Description: This activity was set up by a nursing student as part of her internship program. This school has a very competitive environment, where 5 <sup>th</sup> and 6 <sup>th</sup> grade students do language immersion (5 months of teaching in French and 5 months of teaching in English). This immersion makes the students very anxious and stressed about their academic performance (because the Ministry exams also take place during these years). The nursing intern decided to set up and conduct workshops on stress and anxiety management. 10 workshops (1 per month) were held, in various formats (presentation, film, testimonials, discussions).													

la Stagiaire”	Offered for 1 year	Develope d by the school	Mental health	5 <sup>th</sup> & 6 <sup>th</sup> grade	Not a program (internship project)	Managing emotions and stress	Lecture, individual work, interactive learning strategies	Internal animators	No partner	No other complemen tary mental health initiatives in the school	4.75/5	Moderately sustainable	Institutiona lized
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<sup>i</sup> Bold indicates the partner organization identified as the main partner by the school

<sup>ii</sup> Bowen, F., Normand, R., Fortin, F., Dias, T., Bélanger, J., Desbiens, N., Janosz, M., Dufresne, C., & Lacroix, M. (2006). Rapport final d'évaluation des impacts du programme Vers le pacifique pour les quatre années de sa mise en œuvre (2001-2005). Groupe d'étude sur la médiation en milieu scolaire.

<sup>iii</sup> The Québec healthcare system is made up of 22 integrated centers: 13 are integrated health and social services centres (CISSS) and nine are integrated university health and social services centres (CIUSSS).

<sup>iv</sup> Olweus, D., & Limber, S. P. (2009). The Olweus bullying prevention program: Implementation and evaluation over two decades. In Handbook of bullying in schools (pp. 377-399). Routledge.

<sup>v</sup> Bissonnette, S., Bouchard, C., & St-Georges, N. (2012). Le soutien au comportement positif (SCP) : un système efficace pour la prévention des difficultés comportementales. La Foucade, 12(2), 3.

## **CHAPTER 6. DISCUSSION**

## 6.1 Summary of results

A solid body of literature indicates that school-based health promotion has strong potential to positively impact student health and reduce health inequalities. However, as described in Chapter 2, two main issues with this literature are that: (i) few studies investigate social inequalities in school-based health promotion programming, and (ii) few studies explore the links between social inequalities, school context and school culture, and health promotion programming. In response to these knowledge gaps, the general objective of this thesis was to investigate the associations between school deprivation, school culture, and HPI availability. This thesis is a first step in exploring how these three concepts relate one to the other by addressing the four research questions described below.

### *6.1.1 Does HPI availability vary according to school deprivation?*

Our analysis of health promotion programming in 171 Québec elementary schools showed that schools offered on average, a similar number of HPis, regardless of school deprivation. There was no association between school deprivation and HPI availability for HPis addressing physical activity, oral health, bullying and exclusion, and sex education. Differences were however apparent for mental health – specifically, a notably lower proportion of disadvantaged schools had offered a mental health HPI in the past year. We contextualized these findings considering the four ministerial mandates implemented by the government of Québec to address bullying ([An Act to Prevent and Stop Bullying and Violence in Schools, 2012](#)), oral health ([Ministère de la Santé et des Services sociaux, 2015](#)), physical activity ([Ministère de l'Éducation, du Loisir et du Sport, 2017](#)), and sex education ([Ministère de l'Éducation et de l'Enseignement supérieur, 2018](#)). These in fact represent the four health themes for which HPis were available in equivalent proportions

across very advantaged, moderately advantaged and disadvantaged schools. It is possible that these ministerial mandates favoured the implementation of HPIs addressing these themes. In contrast, there was no ministerial mandate for mental health and well-being, and HPIs addressing this issue were distributed unevenly across schools according to level of student disadvantage.

We also quantified the association between school deprivation and the importance of health issues in the student body, as perceived by school staff. Higher school deprivation was associated with a greater number of health issues perceived as important. Further, relatively more disadvantaged schools perceived that health-related issues including lack of physical activity, unhealthy eating, problems with personal hygiene, and dental health problems were important.

### ***6.1.2 Does health-promoting school culture vary according to school deprivation?***

Because of a lack of consensus on reliable and valid measures of school culture, we drew on the Health Promoting Schools framework to develop theoretically grounded and psychometrically sound measures of a health-promoting school culture, defined as a school context that influences and facilitates HPI adoption, implementation, and sustainment. We developed measures for four dimensions of school culture including school/teacher commitment to student health, school physical environment, parent/community engagement with the school, and ease of principal leadership.

Higher school deprivation was associated with lower parent/community engagement with the school. This finding was consistently significant whether school deprivation was operationalized as social deprivation in the school neighborhood (i.e., a Pampalon measure) or parental SES of the

students in the school (i.e., the Indice de milieu socio-économique (IMSE)). Higher student deprivation was also associated with lower scores for school physical environment when student deprivation was measured with the IMSE ([Appendix I](#)). Finally, although not significant, there was a trend in school/teacher commitment to student health according to social deprivation in the neighborhood (i.e., schools in more socially deprived neighborhoods had lower scores). No associations were detected between a health-promoting school culture and material deprivation in the school neighborhood.

### ***6.1.3 What factors in the school context correlate with mental health HPI availability?***

Given the unequal availability of mental health HPIs in Québec elementary schools, we focused on the case of mental health HPIs to shed light on potential mechanisms underpinning this apparent inequality. We investigated which factors in the school context might explain why, in the absence of a ministerial mandate, some schools had implemented mental health HPIs while others had not. We selected an array of factors indicative of school context, including student demographics, school and staff characteristics, and the four dimensions of a health-promoting school culture. Correlates of the availability of mental health HPIs included lower student deprivation, English language of instruction, staff perceiving that mental health issues are important enough to necessitate action in the school, higher teacher turnover, and higher scores for parent/community engagement with the school.

### ***6.1.4 How well do school-based mental health HPIs align with evidence-based practices?***

Our analysis of 25 mental health HPIs implemented in elementary schools in Québec showed that two evidence-based practices for mental health promotion were integrated in all interventions: skill

development (i.e., a focus on developing student skills rather than solely providing knowledge) and active learning strategies (i.e., interactive teaching methods rather than didactic). We analyzed other evidence-based practices by grouping them into two naturally occurring and relevant categories that emerged in the cross-case analysis: (1) intervention content aligned with a whole-school approach including changes to the school culture, and (2) level of adaptation to the school context. Mental health HPIs were then characterized based on their alignment with the two categories of variables. Few mental health HPIs were designed with a whole-school approach or involved changes to the school culture (e.g., implementation of new school policies, involvement of families and community, changes to the school physical environment). However, most schools had developed *de novo* or made modifications to their mental health HPI, indicative of a high level of adaptation to the school context. In a third category of evidence-based practices related to the implementation process, we found that there was a lack of HPI evaluation by schools, and that HPIs that were least aligned with a whole-school approach had been implemented with fewer evidence-based implementation practices.

## **6.2 Contributions to the literature**

### ***6.2.1 School-based HPIs are indissociable from the multiple layers of context in which they are implemented***

The findings in this thesis suggest that the context in which school-based HPIs are implemented matters. Although the association between context and program attributes is not a new finding, the integration of context in the conceptualization, implementation and evaluation of interventions has been limited (May et al., 2016; Poland et al., 2008). Health promotion and public health interventions have often been considered as entities that are distinct from their context (Potvin et

al., 2012). In this approach, context mostly matters in that it could compromise how an intervention was implemented, how it attained its goals, and how it was evaluated (Poland et al., 2008). Researchers conducting program evaluation have often attempted to isolate intervention effects from “contextual interference” and ascribed a strong value to implementation fidelity (i.e., defined as “the degree to which programs are implemented as intended by the program developers” (Carroll et al., 2007)). Many argued that to maintain effectiveness, interventions should not be changed when implemented in different settings (Dusenbury et al., 2003; von Thiele Schwarz et al., 2019). However, critics of this approach have highlighted that a less rigid adherence to fidelity could improve the fit with the local context and produce better outcomes (Berta et al., 2019; Chambers et al., 2013).

The findings in this thesis support the recent shift in implementation science towards an approach that increasingly considers context as an integral part of interventions. Rather than fixed entities, interventions are instead conceptualized as events interacting and co-evolving with their context (Berta et al., 2019; Hawe et al., 2009). Evaluation of these complex, adaptive interventions requires an ability to distinguish what is specific to the context and what is specific to the intervention and how they interact, to enable identification of the core elements that can be transferred to other contexts (i.e., often referred to as core functions or active ingredients) (Hawe, 2015; Minary et al., 2018). However, Poland et al (2008) noted that few authors have unpacked aspects of the context that influence health promotion practice, and Minary et al (2018) emphasized that even fewer studies had operationalized context-intervention interactions. This thesis responds in part to this lack of research on the context of health-promoting interventions and contributes to the field by exploring and delineating three different levels of context affecting school-based health promotion



programming: school context, neighborhood context, and policy context. Drawing on Bronfenbrenner socio-ecological theory, we represented the various levels of context as concentric circles in the PromeSS conceptual model (Figure 1, Chapter 4).

### *School context*

At the school level, we focused on health-promoting school culture as a specific context that may influence HPI implementation. Other studies have identified school culture as an important factor for implementation and effectiveness ([Domitrovich et al., 2008](#); [Fair et al., 2018](#); [McIsaac et al., 2017](#)), with some authors theorizing that it can influence staff commitment to a new HPI ([Debowski, 2008](#); [Domitrovich et al., 2008](#)). However, there was a lack of consensus on how to measure school culture and existing measures were diverse, often not grounded in theory, and not psychometrically tested ([Lemerle, 2005](#); [Lucarelli et al., 2014](#); [Pinto et al., 2016](#); [Yoshimura et al., 2009](#)). The theoretically grounded and reliable measures of health promoting school culture developed herein contribute to the literature on school-based health promotion and can be used in future studies. Drawing on the Health Promoting Schools framework ([World Health Organization, 2018](#)), the four dimensions measured with our newly developed tool signal practical targets for interventions to improve school culture by acting on the school social and physical environment, engagement with parents and the community, and principal leadership in the school. Our findings indicate that schools in which these dimensions are optimized are more likely to recognize and respond to student health needs (i.e., in the case of mental health HPis, *Article 3*) and may better adhere to the HPis they implement (i.e., by evaluating them as successful and permanent, [Appendix G](#)). It is important to consider school culture and ensure that conditions are optimal for HPI implementation in all schools ([O'Reilly et al., 2018](#)). Supporting schools to establish a more

health promoting school culture could thus be a key focus in terms of influencing HPI programming through the school context.

In addition, conceptualizing HPIs as events in systems (Hawe et al., 2009) implies a bi-directional influence between HPIs and their context. Our review of best practices for mental health promotion suggests that interventions most likely to produce benefits for students are those implemented with a whole-school approach that target not only student-level knowledge and behaviour, but also aim to impact changes in school culture (Durlak & Wells, 1997; Jané-Llopis & Barry, 2005; Weare & Nind, 2011; Wells et al., 2003). The whole-school approach is consistently identified as an effective approach for health-promoting interventions addressing a variety of health issues (Dabravolskaj et al., 2020; Fung et al., 2012; Hawe et al., 2015; St Leger et al., 2007). Interventions to change school culture could include components such as the implementation of new school policies, changes in the school infrastructure and available equipment, and inclusion of procedures to involve parents and raise awareness of health issues in the home environment. This is supported by a growing body of evidence and authors calling for the implementation of whole-school approaches (Hunt et al., 2015; St Leger et al., 2010; Tang et al., 2009; Thomas & Aggleton, 2016). The role of school culture to facilitate implementation and as a target of intervention points to a positive feedback loop between interventions and their context (May et al., 2016; Poland et al., 2008). School culture can influence HPI implementation, and HPIs in turn can influence school culture, reinforcing its importance in developing and implementing HPIs.

### *Neighborhood context*

Beyond its four walls, the neighborhood in which a school is situated also matters. In many school systems, students attend public schools based on geographical proximity. In Québec, this is especially true for elementary schools, as opposed to high schools for which a greater proportion of students attend private schools (Ministère de l'Éducation et de l'Enseignement supérieur, n.d.). Our work indicates that socioeconomic conditions in the school neighborhood can influence both school context and HPIs. Specifically, we explored social inequalities in student needs and school functioning which could affect interventions and their context. As suggested in Chapter 1, health inequalities in early childhood are well documented (Spencer et al., 2019; Walker et al., 2011). Children from disadvantaged backgrounds are at higher risk of developmental vulnerability and health issues including respiratory illnesses, obesity and overweight (Bradley & Corwyn, 2002; Laurin et al., 2012; Spencer et al., 2019). Our results suggest that school staff perceive higher needs among their students when students come from more disadvantaged backgrounds. This has implications for staff workload (i.e., they may become overwhelmed by trying to address student health and social needs) and their prioritization of issues (i.e., faced with a large number of issues, they may only have the resources to act on a few which they consider as the most urgent) (Archambault et al., 2014; Day & Hong, 2016; Gore et al., 2021; Larson et al., 2018). Constraints in human, material, financial and temporal resources to respond to higher student needs can also affect how the school functions and, in turn, its health-promoting school culture. Other authors have reported higher rates of staff turnover and teacher disengagement in disadvantaged schools (Allen et al., 2018; Grissom, 2011). These challenges can make it more difficult to establish the conditions that facilitate HPI implementation in a school.

### *Policy context*

Our analysis of HPI availability by school deprivation revealed that the policy context could influence school-based health promotion programming. At the provincial level, ministerial mandates in the form of laws and policies may have led to increased HPI availability for specific health-related issues. To the best of our knowledge, this was the first study to observe a possible association between these mandates and health promotion programming in Québec. This finding was also observed in high schools ([Appendix H](#)). In Bronfenbrenner's socio-ecological theory, government agencies and school boards are considered to be a part of a child's exosystem (i.e., environments with which they interact only indirectly but which still have an influence) ([Bronfenbrenner, 1979](#)). Our findings support that actions taken at that level could influence health promotion practices at the school level. Further, HPI availability for mandated topics was equivalent across schools regardless of deprivation, which suggests that mandates could potentially moderate the association between school deprivation and HPI availability. Mandates likely increase staff awareness or prioritization of an issue and may signal expectations for schools to implement HPIs. These findings warrant further investigation, especially in terms of the influence of mandates on HPI implementation and effectiveness.

This thesis contributes to implementation research in school-based health promotion by exploring relationships between HPIs and the multiple, interacting layers of the context in which they are implemented. In practice, our work indicates that interventions on school and policy contexts could favor HPI programming, and that once implemented, HPIs could change school culture to create a more health-promoting environment. This corroborates the need to implement whole-school,

comprehensive approaches like Health Promoting Schools, and to build school capacity to coordinate large-scale interventions adapted to their context.

### ***6.2.2 Engagement with parents and the community may relate to inequalities in school-based health promotion programming***

As discussed in the previous section, neighborhood socioeconomic conditions may impact school-based health promotion programming. In Chapter 2, I exposed the lack of research on social inequalities in school-based health promotion programming. Few studies investigate whether all schools provide HPis in equal quantity and quality levels (Moore et al., 2015). In addition, although the Health Promoting Schools framework is recognized as a promising approach to build healthy school settings for all (Stewart-Brown, 2006), it does not explicitly mention equity across schools. This gap suggests a prevailing assumption in this field that school-based health promotion benefits all students equally. However, such assumptions in populational approaches may obscure the fact that interventions do not always reach the people who need them most (Frohlich & Potvin, 2008; Hart, 1971).

Given that education has a prominent role in reducing poverty (UNESCO Institute for Statistics, 2017) and that almost all children attend school regardless of their background, schools have often been referred to as “social equalizers” (Agostinelli et al., 2022; Commission on the Social Determinants of Health, 2008; Jackson, 2012). Yet, inequalities in the delivery of health promotion in schools could in fact widen health inequalities if those with a relative “head start” (i.e., children growing up in more advantaged conditions and who are at lower risk for health and social issues) are those most exposed to effective health promotion. In this thesis, we found an absence of

inequalities in HPI availability for most topics, which could be due in part to ministerial mandates. More worrisome was the significant difference between advantaged and disadvantaged schools in the availability of HPIs for mental health promotion, an area which is not covered by a government mandate. This is an important refutation of the assumption that all students are necessarily exposed to health promotion in their school setting, and signals that a social inequalities lens is warranted in school-based health promotion research. More work should be conducted with a focus on redressing inequalities in health promotion programming and ultimately narrowing health inequalities.

In addition to quantifying inequalities in HPI availability, we aimed to increase understanding on the potential mechanisms underpinning these inequalities. We built on work by Markham and Aveyard, who hypothesized that school culture may play a role in between-school variations in student health and behaviours (Markham & Aveyard, 2003). We found that disadvantaged schools scored lower for some dimensions of a health-promoting school culture, suggestive that disadvantaged schools could be challenged in the creation of an environment more conducive to HPI implementation. Further, in the case of mental health HPIs, parent and community engagement with the school was associated with both school deprivation and HPI availability. It is possible that this dimension plays a role in the association between school deprivation and HPI availability in disadvantaged schools. Stakeholders in the school community can signal important issues, provide expertise or resources for interventions, and complement interventions with changes in the home and neighborhood environments (Deschesnes et al., 2003; Klassen et al., 2022; Michael et al., 2007; Storey et al., 2016; Tuma, 2020). Yet disadvantaged schools may have limited social capital, with parents in these contexts often facing challenges in their involvement

(e.g., busy workloads, incompatible schedules) (Abrahams, 2013; Davis-Kean & Eccles, 2005) and community organizations in their neighborhoods often hindered by a lack of resources (Bridwell-Mitchell, 2017; Keppler & Smilowitz, 2022). Developing and maintaining social ties with actors external to the school may require time and resources that staff in disadvantaged schools are already devoting to other tasks.

Overall, our results indicate that disadvantaged schools may have more difficulty establishing a health-promoting school culture, which could impede HPI implementation and exacerbate inequalities by hindering the delivery of health promotion to those students with the most to gain. Increasing school engagement with parents and community may be an important way forward to increase school capacity for health promotion programming in disadvantaged settings. For this purpose, implementation of approaches such as Health Promoting Schools remains highly relevant, given that they emphasize the role of the whole school community for health promotion. However, this approach cannot be assumed to produce benefits equally across all schools, especially if adaptation to the specific context is needed.

### ***6.2.3 Ministerial mandates could help reduce inequalities in school-based health promotion programming by signaling emergent issues to address in schools***

Our findings suggest the importance of ministerial mandates and their influence on HPI programming in schools. Such mandates could be useful in promoting intersectoral action and reducing inequalities in HPI availability across schools serving students with different socioeconomic backgrounds. In Québec, they have generally been used to emphasize the importance of addressing specific health issues, but there is no obligation to implement a specific

HPI (i.e., schools have the leeway to adopt or develop HPIs of their own choosing). Given the inequality in mental health HPI availability in Québec elementary schools, a ministerial mandate for school-based mental health promotion may be relevant at this time. In this section I discuss how mandates may facilitate intersectoral action for health in schools, and how they may interact with the school context.

Intersectoral action for health is defined as the collaboration of several sectors of society to initiate actions on health or the determinants of health (Public Health Agency of Canada, 2008). As outlined in the Ottawa Charter for Health Promotion, health promotion is not the sole responsibility of the health sector, and collaboration with other sectors is necessary (World Health Organization, 1986). Health promotion requires concerted action from all sectors including governments, regional and local authorities, industry, and community and volunteer organizations. However, the difficulty of aligning the different goals and perspectives of all parties involved often results in an inability to achieve common objectives (Bilodeau et al., 2017; de Montigny et al., 2019; Holt et al., 2021). For school staff, health promotion is often secondary to educational objectives (Holt et al., 2021; Lucarelli et al., 2014; St Leger et al., 2007). In disadvantaged schools, health promotion can also compete with a variety of other, sometimes more urgent, student needs. Ministerial mandates may help align shared goals across all actors (Nordin et al., 2019). It may also be important to signal issues that otherwise risk “falling through the cracks” if staff in disadvantaged schools are overwhelmed with other challenges.

Through mandates, changes at the policy level are expected to impact individuals in a ‘top-down’ manner. However, top-down approaches have been criticized as overriding local contexts



([Darling-Hammond, 1998](#); [Laverack & Labonte, 2000](#)). In addition, in this thesis we conceptualized the context of HPIs as multiple encircling systems which influence each other. Policies are likely not implemented directly from the Ministry to schools, but rather translated from one level of context to the next ([Nordin et al., 2019](#)). At each level, policy translation is influenced by the norms, values and priorities shared by the different actors in that specific system ([Nordin et al., 2019](#)). Our finding that school level context is an integral component of health promotion programming is further substantiated given that it can influence the way a ministerial mandate is implemented. Adherence of school staff to new approaches or interventions can also be more difficult when staff feel less ownership of the HPI or perceive a poor fit between the HPI and the school context ([Gugglberger & Inchley, 2014](#)).

Mandates thus cannot be conceived as a simple ‘top-down’ approach with direct influence on school-based health promotion, but rather as a potential tool to signal issues and promote intersectoral action at different levels. A combination of top-down policy action through ministerial mandates and ‘bottom-up’ empowerment of school communities is evocative of the “nutcracker effect” described by Baum as the impact of merging both top-down and bottom-up approaches to achieve health equity ([Baum, 2007](#)). We suggest that ministerial mandates may be useful in conjunction with capacity building at the school level (i.e., supporting health promoting school culture to create environments where HPI implementation is facilitated); maintaining a non-prescriptive approach to mandates so that schools have the autonomy to adapt actions to their context; and channels for bottom-up communication from the school level to the policy level so that new issues and challenges can be brought to light. The latter could be especially important for

schools serving disadvantaged or marginalized communities (e.g., immigrant, racialized or Indigenous populations) whose needs may be overlooked by the majority.

### **6.3 Strengths and limitations of the thesis**

As described in Chapter 2, few studies compare health promotion programming across schools according to school deprivation. This thesis stands out from previous studies in three aspects. First, it is innovative in studying a large variety of HPIs across very advantaged, moderately advantaged and disadvantaged schools. Most of the previous literature has focused on single interventions, and some studies on HPIs implemented in disadvantaged schools lacked an overarching perspective. Second, the PromeSS questionnaire was administered by trained research assistants, which helped ensure that school informants understood the questions so that measurement error was likely mitigated. Third, as highlighted in *Articles 1 to 3*, the convenience sample of participating schools was in fact, representative of all eligible Québec schools in terms of language of instruction and IMSE distribution (Ministère de l'Éducation et de l'Enseignement supérieur, 2017). In addition, schools serving fewer than 150 students comprised 25% of our sample vs. 32% of all eligible elementary schools, schools serving 150-350 students comprised 40% of our sample vs. 40% of all eligible schools, and schools serving over 350 students comprised 35% of our sample vs. 28% of all eligible schools (Schola, 2021). This apparent representativity may have increased the external validity of the results.

This thesis was strengthened by using well-established statistical techniques to estimate associations between school deprivation and each of HPI availability and health-promoting school culture. Further, measures of health-promoting school culture were developed in a theoretically

grounded process which resulted in reliable measures and responded to a gap in the literature. Finally, use of descriptive matrices for cross-case analysis was a strength of *Article 3*. Qualitative methods for content analysis allowed increased understanding of how mental health HPIs implemented in Quebec schools aligned with best practices.

### ***6.3.1 Cross-sectional design and causal inference***

However, this thesis is limited because the cross-sectional study design of PromeSS could not disentangle the temporality of “exposures” and “outcomes”, limiting the potential to make causal claims about the associations detected. Temporality can however, be assumed for the relationships between some variables such as school deprivation and HPI availability. Given that the literature supports that school-based interventions are difficult to sustain ([Herlitz et al., 2020](#)), we can postulate that school deprivation is more stable over time than HPI availability. Moreover, the reverse association (i.e., that HPI availability could cause school deprivation) has little plausibility since the determinants of socioeconomic deprivation are more distal than school-level variables ([Marmot, 2005](#)). Despite the potential of school-based HPIs to narrow health inequalities, they likely have little bearing on parental income, occupational status, or level of education. Schools cannot fix social inequalities on their own, but rather they can help mitigate their effects and contribute to preventing widening inequalities ([Tang et al., 2009](#)).

Temporality is more difficult to disentangle for school culture with respect to school deprivation. School culture is thought to be relatively stable over time ([Domitrovich et al., 2008](#)), but is likely also influenced by other characteristics of the school context. In this thesis, we hypothesized that

school deprivation preceded school culture, and that both preceded HPI availability, but these tenets are debatable such that causality is indiscernible.

Selection of potential confounding variables in relation to the associations between contextual variables and mental health HPI availability may also be problematic. The relationship between the different school contextual factors is not well established in the literature. Lack of understanding of causal pathways may have resulted in misclassifying mediators or colliders as confounders, which could have attenuated the associations observed. However, we speculate that the adjusted models in *Article 3* likely address confounding and not mediation, since the covariates (i.e., IMSE, language of instruction, and school size) were considered unlikely to be caused by the other school contextual variables.

### ***6.3.2 Operationalizing school deprivation***

Finally, our measures of school deprivation (i.e., level of deprivation of students in the school) had several limitations. Because data on educational achievement, occupational status and level of income were not available for parents of students, we used ecological indicators (i.e., measures of characteristics of aggregates or groups of individuals ([Greenland, 2001](#))), which may misclassify the true level of deprivation in the school. Both the IMSE and the Pampalon indices were built using Census data. For the IMSE, each student in the school was assigned a score for the indicator based on the prevalence of the two variables of interest (i.e., low schooling of mothers, parental

unemployment) in the “unité de peuplement”<sup>2</sup> in which they lived. The school IMSE was then computed as the average of this indicator across all students (Beauchesne, 2003). However, student indicators may not always accurately reflect their family SES. If some children in a given “unité de peuplement” attended a different school (e.g., a private school, a specialized school), this could have caused underestimation of the level of school deprivation given that those children (who may be from more advantaged families) were taken into account in calculating the level of deprivation of the area. However, this exodus of students towards private schools at the expense of public schools is less of an issue with elementary than high schools (Ministère de l’Éducation et de l’Enseignement supérieur, n.d.). Despite this limitation, the IMSE is the closest available indicator to student SES in a school. In contrast, the Pampalon social and material deprivation indices refer to level of deprivation of the neighborhood in which the school is located (Pampalon et al., 2012). They may be less accurate indicators of the level of deprivation of the student body in the school, but they are indicators of the setting surrounding the school.

Another limitation shared by both the IMSE and Pampalon indicators is that census data may be less and less representative of the “unité de peuplement” as time after data collection passes. Census data are collected every five years and a few more years may be necessary to process the data and calculate the indices (Statistics Canada). The makeup of a neighborhood can change over that time as families move in and out, which can be influenced by phenomena such as gentrification (i.e., “an area-level process in which formerly declining, under-resourced neighborhoods

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<sup>2</sup> “Unités de peuplement” are the geographic divisions on which the IMSE index is based. They are derived from an aggregation of Statistics Canada diffusion areas, which are the smallest possible geographic area for which census data are available. Source: <https://www.donneesquebec.ca/recherche/dataset/indices-de-defavorisation/resource/5e5c85e3-d973-462d-aacf-e6e7412bf247>

experience reinvestment and in-migration of increasingly affluent new residents”) (Firth et al., 2020). For PromeSS schools, we used the IMSE calculated using data from the 2011 Census. While data collection was underway, updated IMSE indicators were released by the Ministry using data from the 2016 Census. For Article 1, we conducted sensitivity analyses using the updated IMSE scores and observed little difference in our results ([Appendix J](#)).

Despite these limitations, our findings contribute to increased understanding of how school deprivation, school culture and HPI availability are related. They have implications for the conceptualization of HPI-context interactions, the issue of inequalities between advantaged and disadvantaged schools, and the potential of ministerial mandates to increase availability of school-based health promotion for all children. This thesis strengthens empirical support for health-promoting school culture as a crucial feature for effective HPIs and the importance of a social inequality lens for the study of school-based health promotion. Conclusions and avenues for future research stemming from this thesis are summarized in the next chapter.

## **CHAPTER 7. CONCLUSION**

Due to an unequal distribution of power and resources, vulnerable sub-groups in the population are disproportionately affected by exposures to risk factors detrimental to their health and fewer opportunities for healthy living ([Braveman et al., 2011](#); [Galobardes et al., 2006](#)). Health inequalities caused by these social conditions are apparent as early as childhood ([Spencer et al., 2019](#); [Walker et al., 2011](#)), widen over time as exposures and risks accumulate ([Braveman & Barclay, 2009](#); [Galobardes, 2004](#); [Lynch & Smith, 2005](#)), and have remained present despite significant efforts to improve population health over the last few decades ([Canadian Institute for Health Information, 2016](#); [Pampalon et al., 2008](#); [Tarkiainen et al., 2012](#)). These inequalities are deemed unjust and avoidable ([Whitehead, 2007](#)), and closing this gap and enabling everyone to gain control over and improve their health has repeatedly been emphasized as a priority ([World Health Organization, 2005, 2014](#)). To address health inequalities, both early intervention and intersectoral action are essential ([World Health Organization, 2005](#)). School-based health promotion is a promising avenue given its potential to reach all children, regardless of socioeconomic background ([St Leger et al., 2007](#)). Although school staff have limited power to act on the determinants of health inequalities ([Tang et al., 2009](#)), studies evaluating HPIs in disadvantaged schools show that such interventions can help mitigate the effects of social inequalities and narrow the gap between disadvantaged and advantaged students ([Hillier-Brown et al., 2014](#); [Vander Ploeg et al., 2014](#)).

This thesis strengthens empirical support for health-promoting school culture as a key school context condition associated with health promotion programming. There has recently been a shift in public health intervention research, moving from conceptualizing the context of an intervention as a set of confounding and interfering factors, to considering the context for its dynamic properties



and how it interacts with the intervention to produce effects (Minary et al., 2018; Pfadenhauer et al., 2015; Poland et al., 2008). Our work aligns with this shift; it indicates that a health-promoting school culture may be important in facilitating HPI implementation, but so is consideration of school culture as a target for effective interventions. A strong body of literature consistently shows that HPIs should provide health education and skill development as well as target elements of the school context (e.g., social and physical environment, engagement with families and the community, principal leadership). To do so, interventions should be planned considering the specific context of each school (Poland et al., 2008), leading to co-evolution of the intervention and the setting into which it is introduced (Shelton et al., 2018). Frameworks like Health Promoting Schools align with this conceptualization (i.e., by promoting whole-school, tailored interventions) (Stewart-Brown, 2006), but this approach has yet to be fully implemented in Québec elementary schools.

Social inequalities which affect individual health may also have an impact on the delivery of school-based health promotion, particularly in schools which serve disadvantaged students. While all schools should be supported to provide effective, sustained health promotion for all students, more intense support may be needed in disadvantaged schools to appropriately respond to student needs. Findings in this thesis suggest that these schools may face increased needs for health promotion but also increased barriers to its delivery, including difficulty establishing some dimensions of a health-promoting school culture. Essential conditions to facilitate school-based health promotion may not always be met, and staff may have more challenges keeping up with emerging health issues that are not mandated. We suggest that mental health promotion is currently an emerging issue for which a ministerial mandate might be warranted.

## 7.1 Future research

The questions addressed in this thesis lead to a range of ideas for future research. One important avenue is the study of HPI implementation with a social inequality lens. Implementation science research is necessary to better understand the processes involved in introducing a new intervention into a setting ([May, 2013](#)). However, such studies remain rare in the field of school-based health promotion, where evaluation is often focused on outcomes only ([St Leger et al., 2007](#)). We addressed this gap in *Article 3* by describing implementation practices for mental health HPIs. However, we were not able to examine whether implementation differed according to school deprivation due to the skewed distribution of the IMSE variable in our sample of HPIs (only 3 of the 25 interventions were implemented in disadvantaged schools). To address the inequalities identified in this thesis, future research should investigate how HPI implementation differs across advantaged and disadvantaged schools. Identifying barriers and facilitators specific to this context will help strengthen capacity for health promotion programming in disadvantaged schools.

Future studies using a social inequality lens should also consider the specific context of schools serving Indigenous students (i.e., First Nations, Inuit, and Métis), which was outside the scope of this thesis. In Canada, Indigenous populations face health inequalities due to the impacts of colonization, systemic racism, and intergenerational trauma ([Kim, 2019](#); [Public Health Agency of Canada, 2018](#)). Staff in schools serving Indigenous children may have different or increased health and social needs to address, different cultural contexts, values and practices, and likely different barriers and facilitators for HPI implementation. In a scoping review of school-based nutrition interventions for Indigenous children in Canada, Gillies et al. (2020) highlighted the need for HPIs

based on the Comprehensive School Health framework (i.e., involving changes to the school environment, policies and partnerships) and that should be culturally adapted, evaluated for relevancy and sustainability, and involving community control and ownership of the intervention. The review indicated that a minority of HPIs aligned with all characteristics of comprehensive interventions, mirroring our analysis of mental health HPIs in this thesis, and that there was underrepresentation of Inuit and Métis contexts in this literature ([Gillies et al., 2020](#)). Future implementation studies in schools serving Indigenous students could help ensure the delivery of effective and appropriate health promotion programming in this specific context. Similarly, children from racialized backgrounds face unique challenges related to structural racism, discrimination, stereotyping, and alienation (Shonkoff et al., 2021). Studies are needed on the barriers and facilitators specific to these school contexts, and on how to culturally adapt or co-design interventions in an empowerment-focused participatory approach.

Another important avenue for future research is to better understand how school culture can be leveraged to improve health promotion programming in all schools, but especially those serving disadvantaged students. Although school culture is not a new construct and has been identified as a facilitator of HPI implementation in many studies ([Debowski, 2008](#); [Forman et al., 2009](#); [Lyon et al., 2018](#); [McIsaac et al., 2017](#)), there is still a lack of knowledge on how changes in school culture can be implemented. Programs developed with a Health Promoting Schools approach, which at its core involves changes in school culture and links with the community, have been found to be effective ([Langford et al., 2014](#)). In Canada, the APPLE Schools program is an example of a whole-school intervention intended to change the school culture and environment to improve student health in disadvantaged schools ([Fung et al., 2012](#)). Multiple evaluation studies

have shown benefits of this intervention for student health outcomes (Ofosu et al., 2018; Vander Ploeg et al., 2014), but only recently has the evaluation of changes in the school culture and community environment been undertaken (Klassen et al., 2022). Further research is needed to understand how such interventions impact school and community environments.

Research is also needed on school health promotion practices in the aftermath of the COVID-19 pandemic. Aggravation of vulnerability factors during the pandemic may have exacerbated health inequalities (Dorn et al., 2020; Melançon & Roberge, 2020). In parallel, disruptions caused by repeated school closures and the enactment of a range of sanitary measures may have influenced the way staff perceive, deliver and evaluate HPIs. As noted by Gray & Jourdan, this crisis could be an opportunity to reflect on and improve intersectoral partnerships between health and education professionals to foster capacity-building for health promotion in schools (Gray & Jourdan, 2021). In this context, school health promotion research remains crucial to help schools achieve their potential for the reduction of health inequalities. In Québec, a second wave of data collection for the PromeSS study planned for 2023-2024 will be useful to identify changes in school-based HPIs and increase understanding on whether COVID-19 affected HPI availability.

Finally, the importance of evidence-based practices in school-based health promotion and the adaptation of interventions to school context also warrant increased attention in future studies. Schools may implement interventions without considering the evidence-base or planning for evaluation (St Leger et al., 2007), and better understanding of these practices is needed. Our findings also suggest that the fit between HPIs and school context may be of particular importance to school staff, possibly because they feel more ownership of interventions that they themselves

develop, than of external interventions (Gugglberger & Inchley, 2014). Additionally, implementation of existing evidence-based interventions may be conducted with a strong emphasis on implementation fidelity, which may not be well received by staff if it entails the integration of many intervention components that are not tailored to the school. Yet implementation scientists increasingly deem that a rigid commitment to fidelity may not be necessary (Berta et al., 2019; Chambers et al., 2013; Moullin et al., 2020) and research is shifting towards understanding adaptations and their impact (Kirk et al., 2020). Co-design of adaptations between researchers, practitioners and school stakeholders could help ensure that interventions fit with the needs and context of the school. Further research is needed on how to increase evidence-based practices for health promotion programming in schools as well as how to help schools effectively adapt existing evidence-based interventions to their context.

In sum, this thesis is a first step to respond to knowledge gaps on social inequalities in school culture and health promotion programming. It demonstrates that the context of HPis includes the school culture as an essential feature of interventions, as well as the socio-economic conditions of the students. I hope it will be followed by further evidence-building by researchers and the delineation of courses of action for practitioners. It is necessary to strengthen schools' capacity to cultivate a health-promoting school culture and implement evidence-based interventions, especially in disadvantaged schools, in order to improve student health and reduce inequalities.

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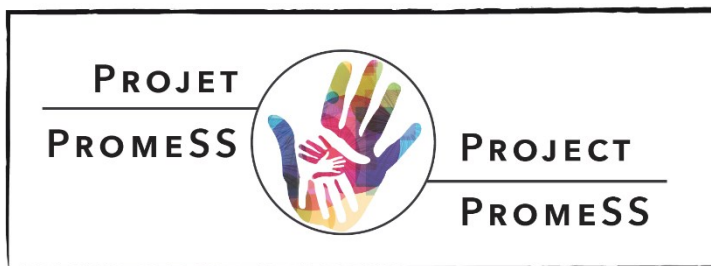
## **APPENDICES**

## **Appendix A. PromeSS Questionnaires**

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## *A.1 Adoption Questionnaire for Elementary Schools*



## **Investigating Social Disparities in School-Based Health-Promoting Programming**

*We thank you again for taking the time to speak with us. Please be assured that your participation is entirely voluntary and confidential. The data collected will not be nominative and the results will not permit identification of a specific school or person. The responses that you provide in this interview will not be shared with your school or schoolboard.*

### **GLOSSARY**

- 1. School-based health promotion** aims to enable students to make enlightened choices affecting their health and well-being by providing age-appropriate health knowledge and experiences, and helping develop health-related skills and helping to build self-esteem and emotional literacy.
- 2. Health-promoting intervention** refers to an activity, class or special event aimed at students, that is: (i) not part of the Ministry-mandated curriculum, (ii) within the school timetable such that participation is expected at the group, class, grade or school-level, (iii) approved by the Governing Board (optional). Health-promoting interventions can address: smoking, healthy eating, physical activity, injury prevention, oral health, sex education, mental health, or intimidation.
- 3. Health-promoting special event** refers to an event that takes place during the school timetable and involves all students in a class, grade or school-wide, +/- parents, +/- community members. The primary focus of an event can be: smoking, healthy eating, physical activity, injury prevention, oral health, sex education, mental health, or intimidation.
- 4. Extra-curricular activity** refers to an activity that contributes to school life (and can also contribute to student health or well-being), provides students with opportunities outside classroom/class hours, in which participation is voluntary and can be associated with an extra cost that is funded by the schoolboard or by parents (e.g. school clubs, sports teams, physical activities, cultural activities, community activities).
- 5. Implementation** refers to the delivery of a health-promoting intervention to students in the school.
- 6. Intervention animators** are individuals tasked with delivering a health-promoting intervention (e.g. teachers, specialists, community organization members, or a combination thereof)
- 7. Smoking** refers to inhalation of smoke from cigarettes and electronic cigarettes (it excludes inhalation of smoke from water pipes or marijuana).
- 8. Smoking prevention** refers to a health-promoting intervention that is aimed at the prevention or delay of the first puff of a cigarette.
- 9. Smoking cessation** refers to an intervention that helps cigarette smokers quit smoking.

10. **Tobacco control education** refers to pedagogical activities that inform students about the health consequences of smoking cigarettes.

11. **Tobacco control intervention** refers to tobacco control education or smoking prevention. This does NOT refer to smoking cessation.

**Q1. During the 2016-2017 school year, did your school have a vice principal?**

- No
- Yes

**Q2. How many students were registered in your school on September 30, 2016 in....?**

	Number
Kindergarten	
Grade 1	
Grade 2	
Grade 3	
Grade 4	
Grade 5	
Grade 6	
Special education classes	
Other (specify) :	

**Q3. During the 2016-2017 school year, how many of the following staff members worked in your school?**

	Full Time	Part Time
Teachers		
Professional staff*		
Health professional staff *		
Special education staff		
Support staff		
Daycare services staff		

\* includes professional or health professional staff that are not paid by your schoolboard

**Q4. During the 2016-2017 school year, how many students in your school.....?**

	Number or Percent
Participated in a nutritional support program (snack)	
Participated in a nutritional support program (meal)	
Were from households in which students live with only one parent, regardless of the reason (separation, divorce, widow/widower)	
Were from low-income households	
Used school daycare services	

**Q5. During the 2016-2017 school year, on average, how many students in your school were absent each day? (Does not include late arrivals or early departures).**

students

**Q6. During the 2016-2017 school year, how many students in your school were considered at risk or EHDAA (élèves handicapés ou en difficultés d'adaptation ou d'apprentissage)?**

students at risk without an intervention plan

students with an intervention plan

**Q7. During the 2016-2017 school year, please indicate the percentage of students whose mother tongue was...**

	Percent
French	
English	
Other	

**Q8. Which setting best describes your immediate school neighborhood?**

- Urban
- Suburban
- Rural
- Other (specify)

**Q9. Indicate your level of agreement. In this school...**

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Meetings with teachers are well attended by parents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Parents attend school-sponsored events	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
PPO (Parent Participation Organization) or Home & School meetings are well attended by parents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Parent volunteers are easy to recruit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Community partners (e.g. community organizations, etc.) are involved in the planning and implementation of joint activities or interventions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q10. Indicate your level of agreement. In the past 3 years your school experienced...**

	Several major changes or complete revision	Few major changes, no minor changes	Several minor changes	Few minor changes	No changes at all
Changes to the educational project objectives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Changes to the success plan	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Teacher turnover	Several staff	Some staff	Few staff	No turnover in the past 3 years	No turnover in more than 3 years
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Principal turnover	3 in 3 years	2 in 3 years	1 in three years	0 in 3 years	0 in more than 3 years
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vice principal turnover	3 in 3 years	2 in 3 years	1 in three years	0 in 3 years	0 in more than 3 years
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q11. For the 2016-2017 school year, please indicate the number and names of all the different sources of funding currently contributing to your school budget over and above the base MEES funding (e.g. SIAA, supplementary Ministry funding (i.e., “mesures”), *Culture in the Schools* program, *Busy Bodies Active Minds* program, fundraising, school foundations, private donations, etc.)**

sources	
1.	6.
2.	7.
3.	8.
4.	9.
5.	10.

Not applicable, school does not receive additional funding

**Q12. Indicate your level of agreement.**

Strongly agree      Agree      Neither agree nor disagree      Disagree      Strongly disagree

Teachers in your school are innovative, always seeking out new ways to facilitate students' progress	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teachers in your school have a real interest in the health of the students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your superior is willing to take a chance on a good idea	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information needed by those who make decisions is widely shared in your schoolboard	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is strong support from your schoolboard for the use of evidence-based practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teachers in your school are committed to promoting healthy behaviours in their students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q13.1. In the past year, how important was each of the following health issues for your Kindergarten students?**

	Extremely important	Very important	Important	Not very important	Not at all important
Aggressive behaviour	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of physical activity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unhealthy eating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inadequate sleep	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Problems with personal hygiene (e.g. hand washing, teeth brushing, bathing, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dental problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of respect for safety (voluntary or involuntary)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Infections, viruses, parasites (e.g. gastroenteritis, flu, lice)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ADHD	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (specify) :	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q13.2. In the past year, how important was each of the following health issues for your Grade 1 and 2 students?**



	Extremely important	Very important	Important	Not very important	Not at all important
Aggressive behaviour	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of physical activity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unhealthy eating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inadequate sleep	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Problems with personal hygiene (e.g. hand washing, teeth brushing, bathing, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dental problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of respect for safety (voluntary or involuntary)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Extremely important	Very important	Important	Not very important	Not at all important
Infections, viruses, parasites (e.g. gastroenteritis, flu, lice)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ADHD	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (specify) :	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q13.3. In the past year, how important was each of the following health issues for your Grade 3 and 4 students?**

	Extremely important	Very important	Important	Not very important	Not at all important
Bullying	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Aggressive behaviour	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of physical activity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unhealthy eating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inadequate sleep	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Problems with personal hygiene (e.g. hand washing, teeth brushing, bathing, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Dental problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of respect for safety (voluntary or involuntary)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Infections, viruses, parasites (e.g. gastroenteritis, flu, lice)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ADHD	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Smoking (including e-cigarettes)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (specify) :	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q13.4. In the past year, how important was each of the following health issues for your Grade 5 and 6 students?**

	Extremely important	Very important	Important	Not very important	Not at all important
Bullying (may include cyberbullying)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Aggressive behaviour	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Problems with mental health (e.g. anxiety)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of physical activity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unhealthy eating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inadequate sleep	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Concerns involving puberty (e.g. physical changes, personal hygiene, girl/boy relations, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dental problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of respect for safety (voluntary or involuntary)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Infections, viruses, parasites (e.g. gastroenteritis, flu, lice)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ADHD	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Smoking (including e-cigarettes)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (specify) :	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q14.1. In the past year, has your school offered any of the following types of extracurricular activities in which participation is voluntary?**

	No	Yes	Total Number	
Competitive sports (extramural)	<input type="radio"/>	<input type="radio"/>		teams
Non-competitive sports (intramural)	<input type="radio"/>	<input type="radio"/>		teams/activities
Physical activities (e.g. dance, ski, martial arts, fitness class, etc.)	<input type="radio"/>	<input type="radio"/>		activities/clubs
Free gym	<input type="radio"/>	<input type="radio"/>		days per week
Special interest clubs (e.g. chess, math, Lego, computer coding, robotics, etc.)	<input type="radio"/>	<input type="radio"/>		clubs
Artistic clubs (e.g. music, theatre, art, etc.)	<input type="radio"/>	<input type="radio"/>		clubs
Other (specify) :	<input type="radio"/>	<input type="radio"/>		

No extracurricular activities were offered in the past year

**Q14.2. Were any of these extracurricular activities offered through the school day care services?**

- No
- Yes → How many?  % or  activities

**Q15. In the past year, has your school offered any health-promoting interventions in which participation is expected at the group, class, grade or school-level to address.....?**

	No	Yes	Total no. of types of interventions
Physical activity/active living (not including physical education classes that are part of the curriculum)	<input type="radio"/>	<input type="radio"/>	
Sex education (e.g. healthy human development, respectful interactions between boys and girls, etc.)	<input type="radio"/>	<input type="radio"/>	
Healthy eating	<input type="radio"/>	<input type="radio"/>	
Bullying and exclusion	<input type="radio"/>	<input type="radio"/>	
Personal safety and injury prevention (e.g. playing safe; potential risks at home, in community, outdoors; safe use of technology, etc.)	<input type="radio"/>	<input type="radio"/>	
Mental health and well-being	<input type="radio"/>	<input type="radio"/>	
Oral health	<input type="radio"/>	<input type="radio"/>	
Multi-component/issue (2 or more). Specify: <input type="text"/>	<input type="radio"/>	<input type="radio"/>	

Other (specify) :

- No health-promoting interventions were offered in the past year

**Q16. Were any of these health-promoting interventions mandated by your school board?**

- No  
 Yes → How many?  % or  types of interventions

**Q17. During the 2016-2017 school year, did your school have a tobacco control intervention (prevention and/or education)?**

- No  
 Yes → *Go to Q21*

**Q18. Which of the following best describes whether your school ever had a tobacco control intervention (prevention and/or education)?**

- Never had one  
 Had one in the past 3 years  
 Had one more than 3 years ago

**Q19. Indicate which stage best describes your school's level of readiness to (re)implement a tobacco prevention intervention.**

- Not currently being considered  
 Discussion has been initiated  
 Concrete actions proposed  
 Concrete actions undertaken to implement in the coming school year

**Q20. Indicate the reason(s) why your school does not have a tobacco control intervention (prevention and/or education). Check all that apply.**

- Concern that such an intervention would inadvertently encourage smoking  
 Such an intervention is more appropriate for high school level students  
 Smoking is not a problem  
 Other student priorities that need to be addressed (specify)   
 Other (specify)

**Q21. Indicate your level of agreement. In your school, ...**

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Area provided for eating meals is pleasant and inviting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Food distribution (including cafeteria, daycare, outside food suppliers, nutritional support programs) prioritizes foods of good nutritional value	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vending machines prioritize foods/beverages of good nutritional value	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Measures are in place to foster active transportation (e.g. crossing guards, secure bike racks, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical activity is provided on all days when there is no physical education class to <b>all students</b> (not including activities during lunch, recess or before/after school)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Indoor facilities for physical education, extracurricular, and other physical activities meet the needs of <b>all students</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Outdoor facilities for physical education, extracurricular, and other physical activities meet the needs of <b>all students</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Indoor school physical activity facilities are available to <b>all students</b> outside the class timetable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Outdoor school physical activity facilities are available to <b>all students</b> outside the class timetable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Access to indoor and outdoor facilities for physical education, extracurricular and other physical activities belonging to other schools or community/private organizations is available to all students (does not include municipal parks).

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*The following questions pertain to ONE specific health-promoting intervention that is currently being offered in your school or that was offered within the last 3 years.*

*If your school is currently offering a tobacco control intervention or has offered one in the last 3 years, please answer the following questions with reference to this tobacco control intervention.*

*If your school does not currently offer a tobacco control intervention or has not offered one in the last three years, then think of any health-promoting intervention that is current or that was offered in the last three years. Please answer the following questions with that one intervention in mind.*

*If your school has not offered any health-promoting interventions in the last three years, please go to Q38.*

*Note that the response choices are in the past tense although we understand that the intervention may be ongoing.*

**Q22. What is the name of the intervention that you wish to use as a reference for our conversation today?**

Name of intervention: \_\_\_\_\_.

**Q23. Was (name of intervention) offered at your school during the 2016-2017 school year?**

No

If not, what year was (name of intervention) last offered to students? \_\_\_\_\_

Yes

If yes, how long has (name of intervention) been offered in your school? \_\_\_\_\_

**Q24. What aspect(s) of your students' health and wellbeing did (name of intervention) address?**

- Smoking prevention
- Tobacco control education
- Aggressive behaviour
- Mental health (e.g. anxiety)

- Bullying (may include cyberbullying))
- Physical activity
- Healthy eating
- Addiction prevention (e.g. alcohol, drugs, gambling)
- Personal hygiene
- Puberty
- Personal safety and injury prevention
- Oral health
- Other (specify) [redacted]

**Q25. Who first signaled the need to address (*health issue Q24*)?**

- School principal
- Vice-principal
- General teacher(s)
- Other teacher(s) (specify specialty) [redacted]
- Special education staff (provide specialty if applicable) [redacted]
- Health professional staff (provide specialty if applicable) [redacted]
- Professional staff (provide specialty if applicable) [redacted]
- Parent(s)
- Member(s) of a community organization
- Other (specify) [redacted]

**Q26. Who originally designed (*name of intervention*)?**

- School principal
- Vice-principal
- General teacher(s) in your school
- Other teacher(s) in your school (specify specialty) [redacted]
- Professional staff member(s) in your school

} → Go to Q27



- Schoolboard (educational services, student services)
- University-based researcher or research team
- Provincial Ministry
- CISSS/CIUSSS (Centre intégré de santé et de services sociaux/Centre intégré universitaire de santé et de services sociaux)
- Community organization (specify) \_\_\_\_\_
- Not-for-profit organization (specify) \_\_\_\_\_
- Private or for-profit organization (specify) \_\_\_\_\_
- Other (specify) \_\_\_\_\_

} → Go to Stream B (page 18)

**Q27. Indicate the reason(s) why your school decided to develop (name of intervention) rather than select an existing intervention. Check all that apply. Existing interventions...**

- Were too complex
- Did not allow for a trial period with a small group of students first
- Did not receive positive reviews from other schools who had adopted these interventions
- Were not compatible with the values of your school
- Could not meet the unique needs of your school
- Could not be used in their entirety – part of an existing intervention was adopted while the majority was developed by your school
- Were not available in the language of instruction
- Were not age appropriate
- Other (specify) \_\_\_\_\_

OR

- Selecting an existing intervention was never formally considered

→ Go to Stream A

*Now think back to before (name of intervention) was selected (or developed) for delivery to students in your school. If your school developed the intervention, please follow Stream A. If your school selected an existing intervention, please follow Stream B.*

*Stream A (Developers)*

**Q28A. Was there a committee set up to develop a health-promoting intervention to address (response to Q24)?**

- No → Go to Q30A

- Yes

**Q29A. Who was on this committee?**

- School principal
- Vice- principal
- General teacher(s)
- Other teacher(s) (specify specialty) \_\_\_\_\_
- Special education staff (provide specialty if applicable) \_\_\_\_\_
- Health professional staff (provide specialty if applicable) \_\_\_\_\_
- Professional staff (provide specialty if applicable) \_\_\_\_\_
- Parent(s)
- Member(s) of a community organization
- Other (specify) \_\_\_\_\_

→ Go to Q31A

**Q30A. If there was no committee, how much input did the following individuals have in the development of the health-promoting intervention to address (health issue Q24)?**

	A lot of input	Some input	A little input	Hardly any input	None
School principal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vice-principal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teachers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Special education staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Health professional staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Professional staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Parent(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Member(s) of a community organization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (specify):	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q31A. Where did your school seek information about (health issue Q24)? Please indicate all that apply.**

- Educational services (schoolboard)
- Colleagues in other schools

- Teachers convention
- Local health organizations (e.g. CISSS/CIUSSS)
- Other organizations (e.g. Canadian Cancer Society, Conseil Québécois sur le tabac et la santé, etc.)
- Government websites
- Other (specify) \_\_\_\_\_

**Q32A. Did you experience any difficulty acquiring relevant information about (health issue Q24)?**

- No → Go to Q34A
- Yes, minor difficulties
- Yes, major difficulties

**Q33A. If yes, how important were each of the following in acquiring information about (health issue Q24)?**

	Extremely important	Very important	Important	Not very important	Not at all important
Time to search for information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of personnel to search for information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to health and social services in your school community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (specify) _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q34A. The following is a list of characteristics of health-promoting interventions that can be more or less important for a school to consider when developing a new health promoting intervention. How important were each of the following in the development of (name of intervention) in your school?**

	Extremely important	Very highly important	Highly important	Important	Not important
Compatibility with the values and mission of your school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Compatibility with the school context	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Could be tested in a small group of students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use external animators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Extremely important	Very highly important	Highly important	Important	Not important

Ease of implementation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Time required for school staff to be trained for implementation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use staff members as animator	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (specify)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q35A. The following is a list of school characteristics that can be more or less important to consider when developing a new health promoting intervention. How important were each of the following in the development of (*name of intervention*) in your school?**

	Extremely important	Very highly important	Highly important	Important	Not important
Types of other health-promoting interventions currently being offered to students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of funds that could be allocated specifically for such interventions (including teacher training)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical space	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Level of parental participation in school life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student demographics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Existing partnerships with community organizations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Objectives of your school's educational project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Staff time available for development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (specify) _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

→ Go to Q36 (page 19)

*Stream B (Adopters)*

**Q28B. Was there a committee set up to select a health-promoting intervention to address (health issue Q24)?**

- No → Go to Q30B
- Yes

**Q29B. Who was on this committee?**

- School principal
- Vice-principal
- General teacher(s)
- Other teacher(s) (specify specialty) \_\_\_\_\_
- Special education staff (provide specialty if applicable) \_\_\_\_\_
- Health professional staff (provide specialty if applicable) \_\_\_\_\_
- Professional staff (provide specialty if applicable) \_\_\_\_\_
- Parent(s)
- Member(s) of a community organization
- Other (specify) \_\_\_\_\_

→ Go to Q31B

**Q30B. If there was no committee, how much input did the following individuals have in selecting the health-promoting intervention to address (health issue Q24)?**

	A lot of input	Some input	A little input	Hardly any input	None
School principal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vice-principal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teachers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Special education staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Health professional staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Professional staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Parent(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Member(s) of a community organization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (specify):	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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**Q31B. Did you experience any difficulty acquiring relevant information about potential health-promoting interventions that would address (*health issue Q24*)?**

- No → *Go to Q33B*
- Yes, minor difficulties
- Yes, major difficulties

**Q32B. If yes, how important were each of the following in acquiring information about potential health-promoting interventions that would address (*health issue Q24*)?**

	Extremely important	Very important	Important	Not very important	Not at all important
Time to search for information about new interventions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of personnel to search for information about new interventions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of information about the effectiveness of new interventions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of information about operating costs of new interventions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to health and social services in your school community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (specify)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q33B. Where did your school first learn about (*name of intervention*)?**

- Educational services (schoolboard)
- Colleagues in other schools
- Teachers convention
- Solicitation or proposal by the designers of (*name of intervention*)
- (*name of intervention*) website
- Local health organizations (e.g. CISSS/CIUSSS)
- Other organizations (e.g. Canadian Cancer Society, Conseil Québécois sur le tabac et la santé, etc.)
- Government websites
- Other (specify)

**Q34B. The following is a list of characteristics of health-promoting interventions that can be more or less important for a school when selecting a new intervention. How important were each of the following in your school's decision to choose (*name of intervention*) in your school?**

	Extremely important	Very highly important	Highly important	Important	Not important
Was successful in (an)other school(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Required a reasonable amount of staff time (for training, program delivery)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Could be easily adapted to your school context	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Represented an improvement over what your school had before	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Could be implemented within your budget	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Was compatible with your school values, norms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Was compatible with your school's context	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Could be tested in a small group of students first	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Identified key components required to replicate effectiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Could be delivered by animator external to the school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Had documented empirical evidence of effectiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Was available at no cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (specify) _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q35B. The following is a list of school characteristics that can be more or less important to consider when selecting a new intervention. How important were each of the following in your school's decision to choose (*name of intervention*) in your school?**

	Extremely important	Very highly important	Highly important	Important	Not important
Types of other health-promoting interventions currently being offered to students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of funds that could be allocated specifically for such interventions (including teacher training)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical space	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Level of parental participation in school life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student demographics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Existing partnerships with community organizations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Objectives of your school's educational project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (specify) _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q36. Was there someone who advocated strongly for the intervention and supported its adoption despite barriers?**

- No → Go to Q38
- Yes

**Q37. Please indicate their job title(s). Check all that apply.**

- School principal
- Vice-principal
- General teacher(s)
- Other teacher(s) (specify specialty) \_\_\_\_\_
- Special education staff (provide specialty if applicable) \_\_\_\_\_
- Health professional staff (provide specialty if applicable) \_\_\_\_\_



- Professional staff (provide specialty if applicable) \_\_\_\_\_
- Parent(s)
- Member of your Schoolboard (specify) \_\_\_\_\_
- Member(s) of a community organization
- Other (specify) \_\_\_\_\_

*This ends the section pertaining to (name of intervention)*

## RESPONDENT CHARACTERISTICS

**Q38. Are you...?**

- Female
- Male

**Q39. How old are you?**

- < 30
- 30 - 39
- 40 - 49
- 50 - 59
- ≥ 60

**Q40. What is the highest level of education that you have completed?**

- Bachelor's degree (specify field of study) \_\_\_\_\_
- Graduate diploma or certificate (specify field of study) \_\_\_\_\_
- Master's (specify field of study) \_\_\_\_\_
- PhD (specify field of study) \_\_\_\_\_
- Other (specify) \_\_\_\_\_

**Q41. How many years have you been working in your current position?**

- Less than one year
- 1-3
- 4-6
- 7-9
- ≥ 10

**Q42. How many years of experience do you have working as a \_\_\_\_\_ ?**

- Less than one year

- 1-3
- 4-6
- 7-9
- ≥ 10

**Q43. What percentage of your time do you spend in...?**

	%
Administrative tasks	
Interacting with students	
Interacting with staff	
In meetings	
Your professional development (e.g. conferences, webinars)	
Other (specify)	

**Q44. Please indicate your level of agreement.**

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
The amount of emphasis on health promotion in your school's educational project is sufficient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
School-based smoking prevention programs offered in elementary schools make a difference	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Health-promoting interventions can improve academic outcomes as well as reduce health risk behaviors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
School-based programs are vital to smoking prevention in children at the elementary level	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Staff smoking influences student smoking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E-cigarettes are as harmful as combustible cigarettes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Some children will smoke no matter what we do	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Participation in school physical activities and sports fosters a lifelong active lifestyle

- 
- 

**Q45. If you smoke, how frequently do you smoke?**

- Every day  
 Less than every day  
 I do not smoke

**Q46. During the last 7 days, on how many days did you do vigorous physical activities for at least 10 minutes at a time (e.g. running, fast bicycling or swimming, aerobics, etc.)?**

- None → *Go to Q48*  
 day(s) per week

**Q47. How much time did you spend doing vigorous physical activities on those days ?**

minutes per day

**Q48. During the last 7 days, on how many days did you do moderate physical activities for at least 10 minutes at a time (e.g. walking, bicycling at a regular pace, doubles tennis, etc.)?**

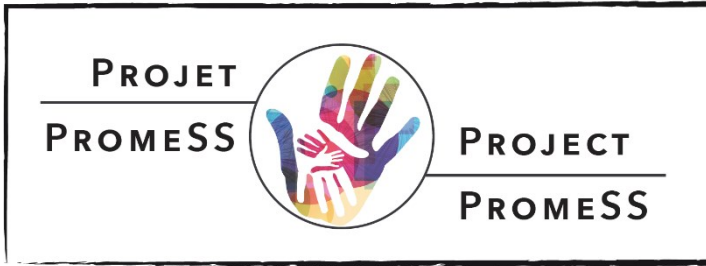
- None → *End of questionnaire*  
 day(s) per week

**Q49. How much time did you spend doing moderate physical activities on those days ?**

minutes per day

**End of Questionnaire - THANK YOU!**

## A.2 Implementation Questionnaire for Elementary Schools



## Investigating Social Disparities in School-Based Health-promoting Programming

*We thank you again for taking the time to speak with us. Please be assured that your participation is entirely voluntary and confidential. The data collected will not be nominative and the results will not permit identification of a specific school or person. The responses that you provide in this interview will not be shared with your school or schoolboard.*

### GLOSSARY

- 1. School-based health promotion** aims to enable students to make enlightened choices affecting their health and well-being by providing age-appropriate health knowledge and experiences, and helping develop health-related skills and helping to build self-esteem and emotional literacy.
- 2. Health-promoting intervention** refers to an activity, class or special event aimed at students, that is: (i) not part of the Ministry-mandated curriculum, (ii) within the school timetable such that participation is expected at the group, class, grade or school-level, (iii) approved by the Governing Board (optional). Health-promoting interventions can address: smoking, healthy eating, physical activity, injury prevention, oral health, sex education, mental health, or intimidation.
- 3. Health-promoting special event** refers to an event that takes place during the school timetable and involves all students in a class, grade or school-wide, +/- parents, +/- community. The primary focus of an event can be: smoking, healthy eating, physical activity, injury prevention, oral health, sex education, healthy human development, mental health, or intimidation and aggressive behavior.
- 4. Extra-curricular activity** refers to an activity that contributes to school life (and can also contribute to student health or well-being), provides students with opportunities outside classroom/class hours, in which participation is voluntary and can be associated with an extra cost that is funded by the schoolboard or by parents (e.g. school clubs, sports teams, physical activities, cultural activities, community activities).
- 5. Implementation** refers to the delivery of a health-promoting intervention to students in the school.
- 6. Intervention animators** are individuals tasked with delivering a health-promoting intervention (e.g. teachers, specialists, community organization members, or a combination thereof)
- 7. Health-promoting school policy** is a school policy designed to create conditions that support making healthy choices.

*Most of the following questions pertain to the reference intervention that was chosen as an example in the first interview.*

\*\*\*\*\*

*To answer the following questions, please refer to the first time the (name of intervention) was implemented in your school. Note that the response choices are in the past tense although we understand (name of intervention) may be ongoing.*

**Q1. Which grade(s) received (name of intervention)? Check all that apply.**

- Kindergarten
- Grade 1
- Grade 2
- Grade 3
- Grade 4
- Grade 5
- Grade 6
- All grades (adjusted for age-appropriate content)
- Other (specify) \_\_\_\_\_

**Q2. Were the following members of the school community included in (name of intervention)? Check all that apply.**

- No
- Yes →  Families (invited to participate)
  - Families (informed about intervention)
  - Community groups (invited to participate)
  - Community groups (informed about intervention)
  - Other (specify) \_\_\_\_\_

**Q3. (Name of intervention) was a...**

- Special event (e.g. health fair, guest speaker at an assembly, etc.) (specify) \_\_\_\_\_
- Pedagogical activity
- Learning and evaluation situation
- Programme (specify) \_\_\_\_\_
- Other (specify) \_\_\_\_\_

**Q4. Were any of the following core competencies incorporated into (*name of intervention*)? Check all that apply.**

- Self-esteem
- Managing emotions and stress
- Positive interactions with others
- Self-awareness
- Learning to saying “no”
- Asking for help
- Informed lifestyle choices
- Adoption of prosocial choices
- Management of social influences
- Social engagement
- Other (specify) \_\_\_\_\_

**Q5. Were there any other initiatives occurring in your school before or around the same time as (*name of intervention*) that addressed the same health and wellbeing issue as (*name of intervention*)? Check all that apply.**

- No
- Yes →  Media campaign (e.g. posters, distribution of leaflets, social media, etc.)
  - Assemblies
  - Extra-curricular activities (specify) \_\_\_\_\_
  - Linking to services offered by external organization (specify) \_\_\_\_\_
  - Infrastructure (e.g. installation of bike racks) (specify) \_\_\_\_\_
  - Social environment (e.g. increased surveillance, support to students, etc.) (specify) \_\_\_\_\_
- School policy (e.g. nutrition, physical activity, bullying, etc.) (specify) \_\_\_\_\_
- School day care service activities (specify) \_\_\_\_\_
- Special events (specify) \_\_\_\_\_
- Other (specify) \_\_\_\_\_

**Q6. What type of learning strategy was used for (*name of intervention*)? Check all that apply.**

- Lecture strategies: presentations, demonstrations
- Individual work: independent practice
- Interactive teaching strategies: group discussion, role-play, modeling
- Social constructivist teaching strategies: peer education, tutoring, collaborative and cooperative learning
- Other (specify) \_\_\_\_\_

**Q7. Did your school work with any other organization(s) in relation to the (*name of intervention*)? Check all that apply.**

- No → *Go to Q10*
- Yes →
  - High school(s)
  - Other elementary school(s)
  - Organization that developed (*name of intervention*)
  - Local municipality
  - Police department
  - CISSS/CIUSSS (Centre intégré de santé et de services sociaux/Centre intégré universitaire de santé et de services sociaux)
  - Community organization(s) (specify) \_\_\_\_\_
  - Not-for-profit organization(s) (specify) \_\_\_\_\_
  - For-profit organization (specify) \_\_\_\_\_
  - Resource centre (i.e., organization engaged in information sharing, professional development in a specific domain)
  - Other (specify) \_\_\_\_\_

**Q8. Who would you consider to be the main organization to work with your school in relation to (*name of intervention*)?**

- High school
- Other elementary school
- Organization that developed (*name of intervention*)
- Local municipality
- Police department
- CISSS/CIUSSS (Centre intégré de santé et de services sociaux/Centre intégré universitaire de santé et de services sociaux)
- Community organization (specify) \_\_\_\_\_
- Not-for-profit organization (specify) \_\_\_\_\_
- For-profit organization (specify) \_\_\_\_\_
- Resource centre (i.e., organization engaged in information sharing, professional development in a specific domain)
- Other (specify) \_\_\_\_\_

**Q9. Which of the following supports did this main organization provide? Check all that apply.**

- Funding

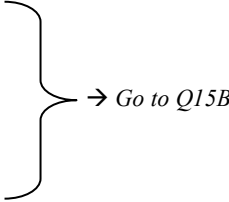
- Services (e.g. expertise; can include mentorship, graphic design, translation, etc.)
- Intervention materials (e.g. animator manuals, student workbooks/handouts, promotional materials, toolkits, etc.)
- Other materials (e.g. ingredients, sports equipment, etc.)
- Personnel - animators
- Personnel – other (specify: \_\_\_\_\_)
- Training
- Technical assistance (limited to assistance with software or equipment)
- Space/Facility
- Access to a network of organizations
- Competition prizes
- Other (specify) \_\_\_\_\_

**Q10. Who was responsible for planning how (name of intervention) would be implemented in the first year? Check all that apply.**

- A team composed of members of the school staff
- A team composed of members of the school staff and a partner organization (answer to Q7)

OR

- School principal
- Vice-principal
- General teacher
- Other teacher (specify specialty) \_\_\_\_\_
- External agency
- (Name of intervention) developers
- Other (specify) \_\_\_\_\_



**Q11. How many implementation team members were there?** \_\_\_\_\_

**Q12. Was one implementation team member considered to be the leader?**

- No → Go to Q14
- Yes → If yes, was this team member you or your predecessor?
  - No
  - Yes

**Q13. How difficult was it for the implementation team leader to...**

	Very easy	Easy	Neither easy nor difficult	Difficult	Very difficult
Recognize and appreciate team efforts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Resolve obstacles to implementation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Delegate tasks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communicate his or her vision clearly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stay on budget	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Be knowledgeable about all aspects of the intervention	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Solve problems within the team	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Solve problems associated with the intervention	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q14. Were clear roles assigned to each implementation team member?**

- No
- Yes
- Don't know

→ Go to Q15A

**Q15A. Indicate your level of agreement. The implementation team...**

	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
Met regularly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Maintained open communication to facilitate knowledge-sharing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Contributed to professional development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Made joint decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Developed a written plan to facilitate implementation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Established written standards for implementation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Solved critical implementation issues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Could answer questions about the *(name of intervention)*                             

→ Go to Q16

**Q15B. The individuals who were responsible for planning the implementation ...**

	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
Developed a written plan to facilitate implementation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Established written standards for implementation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Solved critical implementation issues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Could answer questions about the <i>(name of intervention)</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*Now think back to before (name of intervention) was delivered to students for the first year in your school.*

**Q16. Prior to implementation, did your school make any modifications to *(name of intervention)*?**

- No modifications were made: it could be used as is → Go to Q19
- No modifications were made: it was already tailored to our school → Go to Q19
- No modifications were made: other reason (specify) \_\_\_\_\_ : → Go to Q19
- Yes, minor modifications
- Yes, major modifications
- Yes, but don't know if they were major or minor modifications → Go to Q19
- Don't know. An external agency implemented the intervention in our school → Go to Q19

**Q17. Did your school do any of the following to modify the *(name of intervention)*? Check all that apply.**

- Change objectives
- Change instructional format
- Change sequence of activities
- Change frequency of delivery
- Change duration of delivery
  
- Add relevant role models/speakers
- Add real-life examples
- Add local evidence or data

- Incorporate additional resources
- Remove resources that were not available at the school (e.g. workbooks, laptops, etc.)
- Remove content
- Eliminate activities deemed less critical
- Adapt wording/expressions
- Translate
- Update content
- Adapt material/equipment
- Adapt content to improve socio-cultural relevance
- Adapt content to account for level of development
- Other (specify) \_\_\_\_\_

**Q18. Modifications to (*name of intervention*) were made based on.... Check all that apply.**

- Consultation with the (*name of intervention*) developers
- Guidelines in the (*name of intervention*) user manual or brochure
- Teachers' experience and judgment
- Intervention animator's experience and judgment
- Other (specify) \_\_\_\_\_

**Q19. Indicate your level of agreement. Prior to implementing (*name of intervention*)...**

	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
Training was provided to ( <i>name of intervention</i> ) animators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Methods to collect evaluation data were developed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Indicators were developed to evaluate the impact of the ( <i>name of intervention</i> )	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The ( <i>name of intervention</i> ) was pilot tested in a small group of students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q20. Was there someone who advocated strongly for the intervention and supported its implementation despite barriers?**

- No → Go to Q22
- Yes

**Q21. Please indicate their job title(s). Check all that apply.**

- School principal
- Vice-principal
- General teacher
- Other teacher (specify specialty) \_\_\_\_\_
- Special education staff (specify specialty, if applicable) \_\_\_\_\_
- Health professional staff (specify specialty, if applicable) \_\_\_\_\_
- Professional staff (specify specialty, if applicable) \_\_\_\_\_
- Parent(s)
- Member of your Schoolboard (specify) \_\_\_\_\_
- Member of a community organization
- Other (specify) \_\_\_\_\_

*The following questions pertain to the delivery of (name of intervention) to the students in your school during the first year.*

**Q22. What was your role during the implementation of (name of intervention)? Indicate all that apply.**

- Animator delivering the intervention to students
- Member of the implementation team
- Leader of the implementation team
- No direct role during the implementation
- Other (specify) \_\_\_\_\_

**Q23. (Name of intervention) animators were... Check all that apply.**

- General teachers
- Other teachers (specify specialty) \_\_\_\_\_
- Student-peers
- School health professionals (e.g. nurse, dental hygienist, etc.)
- Other (specify) \_\_\_\_\_
  
- External health professionals (e.g. physician)
- Members of a community organization (specify) \_\_\_\_\_
- CEGEP or university students
- Other (specify) \_\_\_\_\_

} → Go to Q24A

} → Go to Q24B

**Q24A. How difficult was it for (name of intervention) animators to...**

	Very easy	Easy	Neither easy nor difficult	Difficult	Very difficult
Acquire the skills needed to deliver the (name of intervention)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Solve problems related to the <i>(name of intervention)</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Deliver <i>(name of intervention)</i> as it was intended by the intervention developers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

→ Go to Q25

**Q24B. Indicate your level of agreement. *(Name of intervention)* animators...**

	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
Had the skills required to deliver the <i>(name of intervention)</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Could solve problems related to the <i>(name of intervention)</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Worked well with the students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Understood the school context enough to modify the <i>(name of intervention)</i> appropriately	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Understood the concept of delivering an intervention with fidelity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Were enthusiastic about the <i>(name of intervention)</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q25. Did *(name of intervention)* change during its implementation? *(Name of intervention)*...**

- Did not change at all → Go to Q28
- Underwent minor modifications
- Underwent major modifications
- Changed completely
- Don't know. An external agency implemented the intervention in our school → Go to Q28

**Q26. During (not prior to) implementation, did your school do any of the following to modify *(name of intervention)*? Check all that apply**

- Change objectives
- Change instructional format
- Change sequence of activities
- Change frequency of delivery

- Change duration of delivery
- Add relevant role models/speakers
- Add real-life examples
- Add local evidence or data
- Incorporate additional resources
- Remove resources that were not available at the school (e.g. workbooks, laptops, etc.)
- Remove content
- Eliminate activities deemed less critical
- Adapt wording/expression
- Translate
- Update content
- Adapt material/equipment
- Adapt content to improve socio-cultural relevance
- Adapt content to account for level of development
- Other (specify) \_\_\_\_\_

**Q27. Modifications to (*name of intervention*) during implementation were made based on.... Check all that apply.**

- Consultation with the (*name of intervention*) developers
- Guidelines in the (*name of intervention*) user manual or brochure
- Teachers' experience and judgment
- Intervention animator's experience and judgment
- Other (specify) \_\_\_\_\_

**Q28. Did any of the following changes occur in your school as a result of implementing (*name of intervention*)?**

	No	Yes
Changes to the social environment (e.g. increased supervision, emotional support for the students, development of relaxation areas, etc.)	<input type="radio"/>	<input type="radio"/>
Changes to school infrastructure (e.g. bicycle racks)	<input type="radio"/>	<input type="radio"/>
Update of teachers' roles and responsibilities	<input type="radio"/>	<input type="radio"/>
Addition of health-promoting interventions	<input type="radio"/>	<input type="radio"/>
Addition of extra-curricular activities	<input type="radio"/>	<input type="radio"/>
Modification/termination of other health-promoting interventions	<input type="radio"/>	<input type="radio"/>

Addition of equipment	<input type="radio"/>	<input type="radio"/>
Revision of school policy or addition of new school policy	<input type="radio"/>	<input type="radio"/>
Other (specify)	<input type="radio"/>	<input type="radio"/>

It is too early to know if changes have occurred

**Q29. Did your school do any of the following to evaluate (*name of intervention*)?**

	No	Yes
Hold regular meetings	<input type="radio"/>	<input type="radio"/>
Obtain feedback from the ( <i>name of intervention</i> ) animators	<input type="radio"/>	<input type="radio"/>
Document the extent to which implementation was carried out in accordance with the plan	<input type="radio"/>	<input type="radio"/>
Document the number of students participating in the ( <i>name of intervention</i> )	<input type="radio"/>	<input type="radio"/>
Document the barriers and facilitators to implementation	<input type="radio"/>	<input type="radio"/>
Formally evaluate the outcomes of the ( <i>name of intervention</i> )	<input type="radio"/>	<input type="radio"/>
Other (specify)	<input type="radio"/>	<input type="radio"/>

**Q30. Indicate your level of agreement.**

	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
Intervention animators enjoyed working on the ( <i>name of intervention</i> )	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
( <i>Name of intervention</i> ) helped strengthen partnerships with community organizations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Abandoning the ( <i>name of intervention</i> ) had/would have a negative effect on the students.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<i>(Name of intervention)</i> has had a positive impact on students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Schoolboard supports the continuation of the <i>(name of intervention)</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>(Name of intervention)</i> had unexpected consequences (positive or negative) on health and/or behavior.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Please explain: <input type="text"/>					
<i>(Name of intervention)</i> met all objectives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q31. Was the schoolboard involved in the implementation of the intervention?**

- No → Go to Q33
- Yes (specify how: )

**Q32. If yes, indicate your level of agreement. The schoolboard...**

	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
Helped solve problems related to the <i>(name of intervention)</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q33. How permanent do you think the *(name of intervention)* is at your school?**

- Very permanent (as long as it remains relevant)
- Moderately permanent (more or less)
- Not at all permanent → Go to Q35

**Q34. Is *(name of intervention)* explicitly written in your school's orientations (e.g. the educational project, the success plan or others)?**

- No
- Yes

**Q35. Indicate the level of difficulty. In this school how difficult is it for the principal to...?**

	Very easy	Easy	Neither easy nor difficult	Difficult	Very difficult
Demonstrate leadership for change	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Establish a climate of openness to innovation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Ensure that instructional goals are clearly communicated to everyone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Securing resources for health-promoting interventions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Foster respect	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Establish a safe and orderly school environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Guide the staff in the process of solving problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## RESPONDENT CHARACTERISTICS

### Q36. Are you...

- Female
- Male

### Q37. How old are you?

- ≤ 30
- 30 - 40
- 40 - 49
- 50 - 59
- ≥ 60

### Q38. What is the highest level of education that you have completed?

- Bachelor's degree (specify field of study) \_\_\_\_\_
- Graduate diploma or certificate (specify field of study) \_\_\_\_\_
- Master's (specify field of study) \_\_\_\_\_
- PhD (specify field of study) \_\_\_\_\_
- Other (specify) \_\_\_\_\_

### Q39. How many years have you been working in your current position?

- Less than 1
- 1-3
- 4-6
- 7-9

$\geq 10$

**Q40. How many years of experience do you have working as a [REDACTED] ?**

Less than 1

1-3

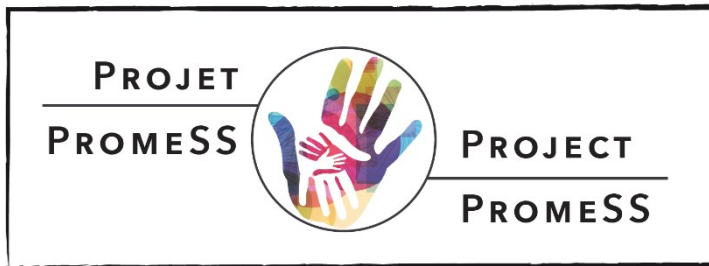
4-6

7-9

$\geq 10$

**THANK YOU!**

### A.3 Adoption Questionnaire for High Schools



## Investigating Social Disparities in School-Based Health-Promoting Programming

*We thank you again for taking the time to speak with us. Please be assured that your participation is entirely voluntary and confidential. The data collected will not be nominative and the results will not permit identification of a specific school or person. The responses that you provide in this interview will not be shared with your school or schoolboard.*

### GLOSSARY

- 1. School-based health promotion** aims to enable students to make enlightened choices affecting their health and well-being by providing age-appropriate health knowledge and experiences, and helping develop health-related skills and helping to build self-esteem and emotional literacy.
- 2. Health-promoting intervention** refers to an activity, class or special event aimed at students, that is: (i) not part of the Ministry-mandated curriculum, (ii) within the school timetable such that participation is expected at the group, class, grade or school-level, (iii) approved by the Governing Board (optional). Health-promoting interventions can address: smoking, healthy eating, physical activity, injury prevention, oral health, sex education, mental health, or intimidation.
- 3. Health-promoting special event** refers to an event that takes place during the school timetable and involves all students in a class, grade or school-wide, +/- parents, +/- community members. The primary focus of an event can be: smoking, healthy eating, physical activity, injury prevention, oral health, sex education, mental health, or intimidation.
- 4. Extra-curricular activity** refers to an activity that contributes to school life (and can also contribute to student health or well-being), provides students with opportunities outside classroom/class hours, in which participation is voluntary and can be associated with an extra cost that is funded by the schoolboard or by parents (e.g. school clubs, sports teams, physical activities, cultural activities, community activities).
- 5. Implementation** refers to the delivery of a health-promoting intervention to students in the school.
- 6. Intervention animators** are individuals tasked with delivering a health-promoting intervention (e.g. teachers, specialists, community organization members, or a combination thereof)
- 7. Smoking** refers to inhalation of smoke from cigarettes and electronic cigarettes (it excludes inhalation of smoke from water pipes or marijuana).
- 8. Smoking prevention** refers to a health-promoting intervention that is aimed at the prevention or delay of the first puff of a cigarette.
- 9. Smoking cessation** refers to an intervention that helps cigarette smokers quit smoking.
- 10. Tobacco control education** refers to pedagogical activities that inform students about the health consequences of smoking cigarettes.

11. **Tobacco control intervention** refers to tobacco control education or smoking prevention. This does NOT refer to smoking cessation.

**Q1. During the 2016-2017 school year, did your school have a vice principal?**

- No
- Yes

**Q2. How many students were registered in your school on September 30, 2016 in....?**

	Number
Secondary I	
Secondary II	
Secondary III	
Secondary IV	
Secondary V	
Special education classes	
Other (specify) :	

**Q3. During the 2016-2017 school year, how many of the following staff members worked in your school?**

	Full Time	Part Time
Teachers		
Professional staff*		
Health professional staff *		
Special education staff		
Support staff		

\* includes professional or health professional staff that are not paid by your schoolboard

**Q4. During the 2016-2017 school year, how many students in your school..?**

	Number or Percent
Participated in a nutritional support program (snack)	

Participated in a nutritional support program (meal)

Were from households in which students live with only one parent, regardless of the reason (separation, divorce, widow/widower)

Were from low-income households

**Q5. During the 2016-2017 school year, on average, how many students in your school were absent each day? (Does not include late arrivals or early departures).**

\_\_\_\_\_ students

**Q6. During the 2016-2017 school year, how many students in your school were considered at risk or EHDAA (élèves handicapés ou en difficultés d'adaptation ou d'apprentissage)?**

\_\_\_\_\_ students at risk without an intervention plan

\_\_\_\_\_ students with an intervention plan

**Q7. Please indicate the percentage of students whose mother tongue was...**

	Percent
French	_____
English	_____
Other	_____

**Q8. Which setting best describes your immediate school neighborhood?**

- Urban
- Suburban
- Rural
- Other (specify) \_\_\_\_\_

**Q9. Indicate your level of agreement. In this school...**

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Meetings with teachers are well attended by parents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Parents attend school-sponsored events	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

PPO (Parent Participation Organization) or Home & School meetings are well attended by parents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Parent volunteers are easy to recruit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student volunteers are easy to recruit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Community partners (e.g. community organizations, etc.) are involved in the planning and implementation of joint activities or interventions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q10. Indicate your level of agreement. In the past 3 years your school experienced...**

Changes to the educational project objectives	Several major changes or complete revision <input type="radio"/>	Few major changes, no minor changes <input type="radio"/>	Several minor changes <input type="radio"/>	Few minor changes <input type="radio"/>	No changes at all <input type="radio"/>
Changes to the success plan	Several major changes or complete revision <input type="radio"/>	Few major changes, no minor changes <input type="radio"/>	Several minor changes <input type="radio"/>	Few minor changes <input type="radio"/>	No changes at all <input type="radio"/>
Teacher turnover	Several staff <input type="radio"/>	Some staff <input type="radio"/>	Few staff <input type="radio"/>	No turnover in the past 3 years <input type="radio"/>	No turnover in more than 3 years <input type="radio"/>
Principal turnover	3 in 3 years <input type="radio"/>	2 in 3 years <input type="radio"/>	1 in three years <input type="radio"/>	0 in 3 years <input type="radio"/>	0 in more than 3 years <input type="radio"/>

Vice principal turnover	3 in 3 years	2 in 3 years	1 in three years	0 in 3 years	0 in more than 3 years
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q11. For the 2016-2017 school year, please indicate the number and names of all the different sources of funding currently contributing to your school budget over and above the base MEES funding (e.g. SIAA, supplementary Ministry funding (i.e., “mesures”), *Culture in the Schools* program, *Busy Bodies Active Minds* program, fundraising, school foundations, private donations, etc.)**

sources	
1.	6.
2.	7.
3.	8.
4.	9.
5.	10.

Not applicable, school does not receive additional funding

**Q12. Indicate your level of agreement.**

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Teachers in your school are innovative, always seeking out new ways to facilitate students' progress	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teachers in your school have a real interest in the health of the students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your superior is willing to take a chance on a good idea	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Information needed by those who make decisions is widely shared in your schoolboard	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
There is strong support from your schoolboard for the use of evidence-based practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teachers in your school are committed to promoting healthy behaviours in their students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q13.1. In the past year, how important was each of the following health issues for your secondary I and secondary II students?**

	Extremely important	Very important	Important	Not very important	Not at all important
Bullying and intimidation (may include cyber-bullying)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Aggressive behavior	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mental health (e.g. anxiety)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cigarette smoking (including electronic cigarette use or vaping)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical inactivity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unhealthy eating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sexually transmitted infections	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teen pregnancy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ADHD	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Suicide	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Self-harm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Drug use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alcohol use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (specify) :	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q13.2. In the past year, how important was each of the following health issues for your secondary III through secondary V students?**

	Extremely important	Very important	Important	Not very important	Not at all important
Bullying and intimidation (may include cyber-bullying)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Aggressive behavior	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mental health (e.g. anxiety)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cigarette smoking (including electronic cigarette use or vaping)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical inactivity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unhealthy eating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sexually transmitted infections	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teen pregnancy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ADHD	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Suicide	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Self-harm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Drug use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alcohol use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (specify) :	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q14. In the past year, has your school offered any of the following types of extracurricular activities in which participation is voluntary?**

	No	Yes	Total Number	
Competitive sports (extramural)	<input type="radio"/>	<input type="radio"/>		teams
Non-competitive sports (intramural)	<input type="radio"/>	<input type="radio"/>		teams/activities
Physical activities (e.g. dance, ski, martial arts, fitness class, etc.)	<input type="radio"/>	<input type="radio"/>		activities/clubs
Free gym	<input type="radio"/>	<input type="radio"/>		days per week
Special interest clubs (e.g. chess, math, Lego, computer coding, robotics, etc.)	<input type="radio"/>	<input type="radio"/>		clubs
Artistic clubs (e.g. music, theatre, art, etc.)	<input type="radio"/>	<input type="radio"/>		clubs
Other (specify) :	<input type="radio"/>	<input type="radio"/>		

No extracurricular activities were offered in the past year

**Q15. In the past year, has your school offered any health-promoting interventions in which participation is expected at the group, class, grade or school-level to address.....?**

	No	Yes	Total no. of types of interventions
Physical activity/active living (not including physical education classes that are part of the curriculum)	<input type="radio"/>	<input type="radio"/>	
Sex education (e.g. teen pregnancy, STI prevention, etc.)	<input type="radio"/>	<input type="radio"/>	
Healthy eating	<input type="radio"/>	<input type="radio"/>	
Bullying and exclusion	<input type="radio"/>	<input type="radio"/>	
Personal safety and injury prevention (e.g. potential risks at home, in community, outdoors; safe use of technology, etc.)	<input type="radio"/>	<input type="radio"/>	
Mental health and well-being	<input type="radio"/>	<input type="radio"/>	
Multi-component/issue (2 or more). Specify:	<input type="radio"/>	<input type="radio"/>	
Other (specify) :	<input type="radio"/>	<input type="radio"/>	

No health-promoting interventions were offered in the past year

**Q16. Are any of these health-promoting interventions mandated by your school board?**

- No
- Yes → How many?  % or  types of interventions

**Q17. Does your school currently have a tobacco control intervention (prevention and/or education)?**

- No
- Yes → *Go to Q25*

**Q18. Which of the following best describes whether your school ever had a tobacco control intervention (prevention and/or education)?**

- Never had one
- Had one in the past 3 years
- Had one more than 3 years ago

**Q19. Indicate which stage best describes your school's level of readiness to (re)implement a tobacco prevention intervention.**

- Not currently being considered
- Discussion has been initiated

- Concrete actions proposed
- Concrete actions undertaken to implement in the coming school year

**Q20. Indicate the reason(s) why your school does not have a tobacco control intervention (prevention and/or education). Check all that apply.**

- Concern that such an intervention would inadvertently encourage smoking
- Smoking is not a problem
- Other student priorities that need to be addressed (specify) \_\_\_\_\_
- Other (specify) \_\_\_\_\_

**Q21. Indicate your level of agreement. In your school, ...**

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Area provided for eating meals is pleasant and inviting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Food distribution (including cafeteria, outside food suppliers, nutritional support programs) prioritizes foods of good nutritional value	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vending machines prioritize foods/beverages of good nutritional value	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Measures are in place to foster active transportation (e.g. secure bike racks, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical activity is provided on all days when there is no physical education class (not including activities during lunch, recess or before/after school)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Indoor facilities for physical education, extracurricular, and other physical activities meet the needs of all students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Outdoor facilities for physical education, extracurricular, and other physical activities meet the needs of all students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Indoor school physical activity facilities are available to all students outside the class timetable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Outdoor school physical activity facilities are available to all students outside the class timetable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to indoor and outdoor facilities for physical education, extracurricular and other physical activities belonging to other schools or community/private organizations is available to all students (does not include municipal parks).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*The following questions pertain to ONE specific health-promoting intervention that is currently being offered in your school or that was offered within the last 3 years.*

***If your school is currently offering a tobacco control intervention or has offered one in the last 3 years, please answer the following questions with reference to this tobacco control intervention.***

*If your school does not currently offer a tobacco control intervention or has not offered one in the last three years, then think of any health-promoting intervention that is current or that was offered in the last three years. Please answer the following questions with that one intervention in mind.*

*If your school has not offered any health-promoting interventions in the last three years, please go to Q38.*

*Note that the response choices are in the past tense although we understand that the intervention may be ongoing.*

**Q22. What is the name of the intervention that you wish to use as a reference for our conversation today?**

*Name of intervention:* \_\_\_\_\_.

**Q23. Is (*name of intervention*) currently being offered at your school?**

No

If not, what year was (*name of intervention*) last offered to students? \_\_\_\_\_

Yes

If yes, how long has (*name of intervention*) been offered in your school? \_\_\_\_\_

**Q24. What aspect of your students' health and wellbeing did (*name of intervention*) primarily address?**

- Smoking prevention
- Tobacco control education
- Aggressive behaviour
- Mental health (e.g. anxiety)
- Bullying (may include cyberbullying)
- Physical activity
- Healthy eating
- Addiction prevention (e.g. alcohol, drugs, gambling)
- Sex education (e.g. teen pregnancy, STI prevention, etc.)
- Prevention of accidental injuries
- Suicide prevention
- Prevention of self-harm
- Other (specify) \_\_\_\_\_

**Q25. Who first signaled the need to address (*health issue in Q24*)?**

- School principal
- Vice-principal
- Homeroom teacher(s)
- Other teacher(s) (provide specialty) \_\_\_\_\_
- Special education staff (provide specialty if applicable) \_\_\_\_\_
- Health professional staff (provide specialty if applicable) \_\_\_\_\_
- Professional staff (provide specialty if applicable) \_\_\_\_\_
- Parent(s)
- Student(s)
- Member(s) of a community organization (specify) \_\_\_\_\_
- Other (specify) \_\_\_\_\_

**Q26. Who originally designed (*name of intervention*)?**

- School principal
- Vice-principal
- Homeroom teacher(s) in your school
- Other teacher(s) in your school (specify specialty) \_\_\_\_\_
- Professional staff member(s) in your school
- Student(s)
  
- Schoolboard (educational services, student services)
- University-based researcher or research team
- Provincial Ministry
- CISSS/CIUSSS (Centre intégré de santé et de services sociaux/Centre intégré universitaire de santé et de services sociaux)
- Community organization (specify) \_\_\_\_\_
- Not-for-profit organization (specify) \_\_\_\_\_
- Private or for-profit organization (specify) \_\_\_\_\_
  
- Other (specify) \_\_\_\_\_

} → Go to Q27

} → Go to Stream B (page 16)

**Q27. Indicate the reason(s) why your school decided to develop (*name of intervention*) rather than select an existing intervention. Check all that apply. Existing interventions...**

- Were too complex
- Did not allow for a trial period with a small group of students first
- Did not receive positive reviews from other schools who had adopted these interventions
- Were not compatible with the values of your school
- Could not meet the unique needs of your school
- Could not be used in their entirety – part of an existing intervention was adopted while the majority was developed by your school
- Were not available in the language of instruction
- Were not age appropriate
- Other (specify) \_\_\_\_\_

OR

- Selecting an existing intervention was never formally considered

→ Go to Stream A

Now think back to before (name of intervention) was selected (or developed) for delivery to students in your school. If your school developed the intervention, please follow Stream A. If your school selected an existing intervention, please follow Stream B (page 16).

### Stream A (Developers)

**Q28A. Was there a committee set up to develop a health-promoting intervention to address (response to Q24)?**

- No → Go to Q30A
- Yes

**Q29A. Who was on this committee?**

- School principal
- Vice principal
- Homeroom teachers(s)
- Other teachers(s) (specify specialty) \_\_\_\_\_
- Special education staff (specify) \_\_\_\_\_
- Health professional staff (specify job title) \_\_\_\_\_
- Professional staff (specify) \_\_\_\_\_
- Parent(s)
- Student(s)
- Member(s) of a community organization (specify) \_\_\_\_\_
- Other (specify) \_\_\_\_\_

→ Go to Q31A

**Q30A. If there was no committee, how much input did the following individuals have in the development of the health-promoting intervention to address (response to Q24)?**

	A lot of input	Some input	A little input	Hardly any input	None
School principal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vice-principal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teacher(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Special education staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Health professional staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Professional staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Parent(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Member(s) of a community organization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (specify):	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q31A. Where did your school seek information about (response to Q24)? Please indicate all that apply.**

- Educational services (schoolboard)
- Colleagues in other schools
- Teachers convention
- Local health organizations (e.g. CISSS/CIUSSS)
- Other organizations (e.g. Canadian Cancer Society, Conseil Québécois sur le tabac et la santé, etc.)
- Government websites
- Other (specify):

**Q32A. Did you experience any difficulty acquiring relevant information about (response to Q24)?**

- No → Go to Q34A
- Yes, minor difficulties
- Yes, major difficulties

**Q33A. If yes, how important were each of the following in acquiring information about (response to Q24)?**

	Extremely important	Very important	Important	Not very important	Not at all important
Time to search for information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of personnel to search for information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to health and social services in your community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (specify):	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The following questions pertain to the development of (name of the intervention).

**Q34A. The following is a list of characteristics of health-promoting interventions that can be more or less important for a school to consider when developing a new health promoting intervention. How important were each of the following in the development of (name of intervention)?**

	Extremely important	Very highly important	Highly important	Important	Not important
Compatibility with the values and mission of your school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Compatibility with the school context	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Could be tested in a small group of students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use external animators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ease of implementation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Time required for school staff to be trained for implementation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use staff members as animators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q35A. The following is a list of school characteristics that can be more or less important to consider when developing a new health promoting intervention. How important were each of the following in the development of (name of intervention)?**

	Extremely important	Very highly important	Highly important	Important	Not important
Types of other health-promoting interventions currently being offered to students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of funds that could be allocated specifically for such interventions (including teacher training)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Physical space	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Level of parental participation in school life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student demographics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Existing partnerships with community organizations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Objectives of your school's educational project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Staff time available for development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (specify) _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

→ Go to Q36 (page 19)

### *Stream B (Adopters)*

**Q28B. Was there a committee set up to select a health-promoting intervention to address (response to Q24)?**

- No → Go to Q30B
- Yes

**Q29B. Who was on this committee?**

- School principal
- Vice principal
- Homeroom teachers(s)
- Other teachers(s) (specify specialty) \_\_\_\_\_
- Special education staff (specify) \_\_\_\_\_
- Health professional staff (specify job title) \_\_\_\_\_
- Professional staff (specify) \_\_\_\_\_
- Parent(s)
- Student(s)
- Member(s) of a community organization (specify) \_\_\_\_\_
- Other (specify) \_\_\_\_\_

→ Go to Q31B

**Q30B. If there was no committee, how much input did the following individuals have in selecting the health-promoting intervention to address (response to Q24)?**

	A lot of input	Some input	A little input	Hardly any input	None
School principal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vice principal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Teacher(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Special education staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Health professional staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Professional staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Parent(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Member(s) of a community organization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (specify): _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q31B. Did you experience any difficulty acquiring relevant information about potential health-promoting interventions that would address (response to Q24)?**

- No → Go to Q33B
- Yes, minor difficulties
- Yes, major difficulties

**Q32B. If yes, how important were each of the following in acquiring information about potential health-promoting interventions that would address (response to Q24)?**

	Extremely important	Very important	Important	Not very important	Not at all important
Time to search for information about new interventions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of personnel to search for information about new interventions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of information about the effectiveness of new interventions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of information about operating costs of new interventions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Access to health and social services in your community	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (specify) _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q33B. Where did your school first learn about (name of intervention)?**

- Educational services (schoolboard)
- Colleagues in other schools
- Teachers convention
- Solicitation or proposal by the designers of (name of intervention)
- (name of intervention) website
- Local health organizations (e.g. CIUSSS/CIUSSS)
- Other organizations (e.g. Canadian Cancer Society, Conseil Québécois sur le tabac et la santé, etc.)
- Government websites
- Other (specify) \_\_\_\_\_

**Q34B. The following is a list of characteristics of health-promoting interventions that can be more or less important for a school when selecting a new intervention. How important were each of the following in your school's decision to choose (name of intervention)? (Name of intervention) ...**

	Extremely important	Very highly important	Highly important	Important	Not important
Was successful in (an)other school(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Required a reasonable amount of staff time (for training, program delivery)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Could be easily adapted to your school context	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Represented an improvement over what your school had before	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Could be implemented within your budget	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Was compatible with your school values, norms	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Was compatible with your school's context	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Could be tested in a small group of students first	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Identified key components required to replicate effectiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Could be delivered by animators external to the school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Had documented empirical evidence of effectiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Was available at no cost	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q35B. The following is a list of school characteristics that can be more or less important to consider when selecting a new intervention. How important were each of the following in your school's decision to choose (*name of intervention*)?**

Extremely important      Very highly important      Highly important      Important      Not important

Types of other health-promoting interventions currently being offered to students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability of funds that could be allocated specifically for such interventions (including teacher training)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Physical space	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Level of parental participation in school life	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student demographics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Existing partnerships with community organizations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Objectives of your school's educational project	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (specify) _____	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q36. Was there someone who advocated strongly for the intervention and supported its adoption despite barriers?**

- No → Go to Q38
- Yes

**Q37. Please indicate their job title(s). Check all that apply.**

- School principal
- Vice principal
- Homeroom teacher
- Other teacher (specify specialty) \_\_\_\_\_
- Special education staff (specify) \_\_\_\_\_
- Health professional staff (specify job title) \_\_\_\_\_
- Professional staff (specify) \_\_\_\_\_
- Parent(s)
- Student(s)
- Member of your Schoolboard (specify) \_\_\_\_\_
- Member of a community organization (specify) \_\_\_\_\_
- Other (specify) \_\_\_\_\_

*This ends the section pertaining to (name of intervention)*

## RESPONDENT CHARACTERISTICS

**Q38. Are you...?**

- Female
- Male

**Q39. How old are you?**

- < 30
- 30 - 39
- 40 - 49
- 50 - 59
- ≥ 60

**Q40. What is the highest level of education that you have completed?**

- Bachelor's degree (specify field of study)
- Graduate diploma or certificate (specify field of study)
- Master's (specify field of study)
- PhD (specify field of study)
- Other (specify)

**Q41. How many years have you been working in your current position?**

- Less than one
- 1-3
- 4-6
- 7-9
- ≥ 10

**Q42. How many years of experience do you have working as a \_\_\_\_\_ ?**

- Less than one
- 1-3
- 4-6
- 7-9
- ≥ 10

**Q43. What percentage of your time do you spend in...?**



	%
Administrative tasks	
Interacting with students	
Interacting with staff	
In meetings	
Your professional development (e.g. conferences, webinars)	
Other (specify)	

**Q44. Please indicate your level of agreement.**

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
The amount of emphasis on health promotion in your school's educational project is sufficient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
School-based smoking prevention programs offered in high schools make a difference	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Health-promoting interventions can improve academic outcomes as well as reduce health risk behaviors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
School-based programs are vital to smoking prevention in children at the high school level	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Staff smoking influences student smoking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E-cigarettes are as harmful as combustible cigarettes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Some adolescents will smoke no matter what we do	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participation in school physical activities and sports fosters a lifelong active lifestyle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q45. If you smoke, how frequently do you smoke?**

- Every day
- Less than every day
- I do not smoke

**Q46. During the last 7 days, on how many days did you do vigorous physical activities (e. g. running, fast bicycling or swimming, aerobics, etc.) for at least 10 minutes at a time ?**

None → *Go to Q48*  
[ ] day(s) per week

**Q47. How much time did you spend doing vigorous physical activities on those days ?**

[ ] minutes per day

**Q48. During the last 7 days, on how many days did you do moderate physical activities (e.g. walking, bicycling at a regular pace, doubles tennis, etc.) for at least 10 minutes at a time ?**

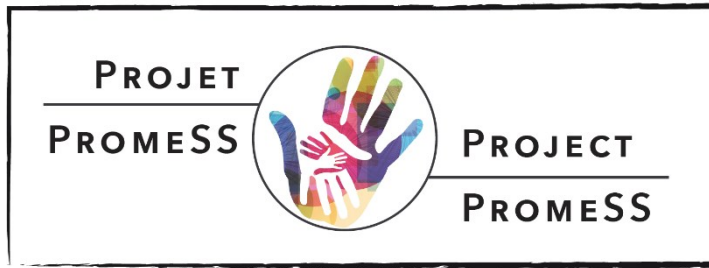
None → *End of questionnaire*  
[ ] day(s) per week

**Q49. How much time did you spend doing moderate physical activities on those days ?**

[ ] minutes per day

**THANK YOU!**

## *A.4 Implementation Questionnaire for High Schools*



## **Investigating Social Disparities in School-Based Health-promoting Programming**

*We thank you again for taking the time to speak with us. Please be assured that your participation is entirely voluntary and confidential. The data collected will not be nominative and the results will not permit identification of a specific school or person. The responses that you provide in this interview will not be shared with your school or schoolboard.*

### **GLOSSARY**

- 1. School-based health promotion** aims to enable students to make enlightened choices affecting their health and well-being by providing age-appropriate health knowledge and experiences, and helping develop health-related skills and helping to build self-esteem and emotional literacy.
- 2. Health-promoting intervention** refers to an activity, class or special event aimed at students, that is: (i) not part of the Ministry-mandated curriculum, (ii) within the school timetable such that participation is expected at the group, class, grade or school-level, (iii) approved by the Governing Board (optional). Health-promoting interventions can address: smoking, healthy eating, physical activity, injury prevention, oral health, sex education, mental health, or intimidation.
- 3. Health-promoting special event** refers to an event that takes place during the school timetable and involves all students in a class, grade or school-wide, +/- parents, +/- community. The primary focus of an event can be: smoking, healthy eating, physical activity, injury prevention, oral health, sex education, healthy human development, mental health, or intimidation and aggressive behavior.
- 4. Extra-curricular activity** refers to an activity that contributes to school life (and can also contribute to student health or well-being), provides students with opportunities outside classroom/class hours, in which participation is voluntary and can be associated with an extra cost that is funded by the schoolboard or by parents (e.g. school clubs, sports teams, physical activities, cultural activities, community activities).
- 5. Implementation** refers to the delivery of a health-promoting intervention to students in the school.
- 6. Intervention animators** are individuals tasked with delivering a health-promoting intervention (e.g. teachers, specialists, community organization members, or a combination thereof)
- 7. Health-promoting school policy** is a school policy designed to create conditions that support making healthy choices.

*Most of the following questions pertain to the reference intervention that was chosen as an example in the first interview.*

\*\*\*\*

*To answer the following questions, please refer to the first time the (name of intervention) was implemented in your school. Note that the response choices are in the past tense although we understand (name of intervention) may be ongoing.*

**Q1. Which grade(s) received (name of intervention)? Check all that apply.**

- Secondary I
- Secondary II
- Secondary III
- Secondary IV
- Secondary V
- All grades (adjusted for age-appropriate content)
- Other (specify) \_\_\_\_\_

**Q2. Were the following members of the school community included in (name of intervention)? Check all that apply.**

- No
- Yes →  Families (invited to participate)
  - Families (informed about intervention)
  - Community groups (invited to participate)
  - Community groups (informed about intervention)
  - Other (specify) \_\_\_\_\_

**Q2. (Name of intervention) was a...**

- Special event (e.g. health fair, guest speaker at an assembly, etc.) (specify) \_\_\_\_\_
- Pedagogical activity
- Learning and evaluation situation
- Programme (specify) \_\_\_\_\_
- Other (specify) \_\_\_\_\_

**Q3. Were any of the following core competencies incorporated into (*name of intervention*)? Check all that apply.**

- Self-esteem
- Managing emotions and stress
- Positive interactions with others
- Self-awareness
- Learning to saying “no”
- Asking for help
- Informed lifestyle choices
- Adoption of prosocial choices
- Management of social influences
- Social engagement
- Other (specify) \_\_\_\_\_

**Q4. Were there any other initiatives occurring in your school before or around the same time as (*name of intervention*) that addressed the same health and wellbeing issue as (*name of intervention*)? Check all that apply.**

- No
- Yes →  Media campaign (e.g. posters, distribution of leaflets, social media, etc.)
  - Assemblies
  - Extra-curricular activities (specify) \_\_\_\_\_
  - Linking to services offered by external organization (specify) \_\_\_\_\_
  - Infrastructure (e.g. installation of bike racks) (specify) \_\_\_\_\_
  - Social environment (e.g. increased surveillance, support to students, etc.) (specify) \_\_\_\_\_
- School policy (e.g. nutrition, physical activity, bullying, etc.) (specify) \_\_\_\_\_
- Special events (specify) \_\_\_\_\_
- Other (specify) \_\_\_\_\_

**Q5. What type of learning strategy was used for (*name of intervention*)? Check all that apply.**

- Lecture strategies: presentations, demonstrations
- Individual work: independent practice
- Interactive teaching strategies: group discussion, role-play, modeling
- Social constructivist teaching strategies: peer education, tutoring, collaborative and cooperative learning
- Other (specify) \_\_\_\_\_

**Q6. Were the following members of the school community involved in (*name of intervention*)? Check all that apply.**

- No
- Yes →  Families (involvement)
- Families (information only)
- Community groups (involvement)
- Community groups (information only)
- Other (specify) \_\_\_\_\_

**Q7. Did your school work with any other organization(s) in relation to the (*name of intervention*)? Check all that apply.**

- No → *Go to Q10*
- Yes →  Elementary school(s)
- Other high school(s)
- Organization that designed (name of intervention)
- Local municipality
- Police department
- CISSS/CIUSSS (Centre intégré de santé et de services sociaux/Centre intégré universitaire de santé et de services sociaux)
- Community organization(s) (specify) \_\_\_\_\_
- Not-for-profit organization(s) (specify) \_\_\_\_\_
- Private or for-profit organization (specify) \_\_\_\_\_
- Resource centre (i.e., organization engaged in information sharing, professional development in a specific domain)
- Other (specify) \_\_\_\_\_

**Q8. Who would you consider to be the main organization to work with your school in relation to (*name of intervention*)?**

- Elementary school
- Other high school
- Organization that designed (name of intervention)
- Local municipality
- Police department
- CISSS/CIUSSS (Centre intégré de santé et de services sociaux/Centre intégré universitaire de santé et de services sociaux)
- Community organization (specify) \_\_\_\_\_
- Not-for-profit organization (specify) \_\_\_\_\_
- Private or for-profit organization (specify) \_\_\_\_\_
- Resource centre (i.e., organization engaged in information sharing, professional development in a specific domain)
- Other (specify) \_\_\_\_\_

**Q9. Which of the following supports did this main organization provide? Check all that apply.**

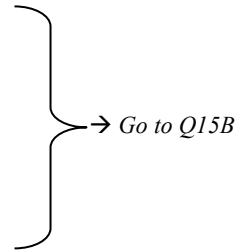
- Funding
- Services (e.g. information or expertise; can include graphic design, translation, etc.)
- Intervention materials (e.g. animator manuals, student workbooks/handouts, promotional materials, toolkits, etc.)
- Other materials (e.g. ingredients, sports equipment, etc.)
- Personnel - animators
- Personnel – other (specify: \_\_\_\_\_)
- Training
- Technical assistance (limited to assistance with software or equipment)
- Space/Facility
- Access to a network of organizations
- Prizes
- Other (specify) \_\_\_\_\_

**Q10. Who was responsible for planning how (*name of intervention*) would be implemented in the first year? Check all that apply.**

- A team composed of members of the school staff
- A team composed of members of the school staff and a partner organization

OR

- School principal
- Vice principal
- Homeroom teacher
- Other teacher (specify specialty) \_\_\_\_\_
- External agency
- (*Name of intervention*) developers
- Other (specify) \_\_\_\_\_



**Q11. How many implementation team members were there?** \_\_\_\_\_

**Q12. Was one implementation team member considered to be the leader?**

- No → Go to Q14
- Yes → If yes, was this team member you or your predecessor?
  - No
  - Yes

**Q13. How difficult was it for the implementation team leader to...**

	Very easy	Easy	Neither easy nor difficult	Difficult	Very difficult
Recognize and appreciate team efforts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Resolve obstacles to implementation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Delegate tasks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communicate his or her vision clearly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stay on budget	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Be knowledgeable about all aspects of the intervention	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Solve problems within the team	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Solve problems associated with the intervention	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q14. Were clear roles assigned to each implementation team member?**

- No
- Yes
- Don't know

→ Go to Q15A

**Q15A. Indicate your level of agreement. The implementation team...**

	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
Met regularly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Maintained open communication to facilitate knowledge-sharing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Contributed to professional development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Made joint decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Developed a written plan to facilitate implementation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Established written standards for implementation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Solved critical implementation issues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Could answer questions about the *(name of intervention)*                             

→ Go to Q16

**Q15B. The individuals who were responsible for planning the implementation ...**

	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
Developed a written plan to facilitate implementation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Established written standards for implementation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Solved critical implementation issues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Could answer questions about the <i>(name of intervention)</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*Now think back to before (name of intervention) was delivered to students for the first year in your school.*

**Q16. Prior to implementation, did your school make any modifications to *(name of intervention)*?**

- No modifications were made: it could be used as is or it was already tailored to our school → Go to Q19
- No modifications were made: we were not able to make any modifications – the intervention was run by an external organization → Go to Q19
- Yes, minor modifications
- Yes, major modifications
- Yes, but don't know if they were major or minor modifications
- I don't know, an outside agency brought it into our school → Go to Q19

**Q17. Did your school do any of the following to modify the *(name of intervention)*? Check all that apply.**

- Change objectives
- Change instructional format
- Change sequence of activities
- Change frequency of delivery
- Change duration of delivery
  
- Add relevant role models/speakers
- Add real-life examples
- Add local evidence or data
- Incorporate additional resources

- Remove resources that were not available at the school (e.g. workbooks, laptops, etc.)
- Remove content
- Eliminate activities deemed less critical
  
- Adapt wording/expressions
- Translate
  
- Update content
- Adapt material/equipment
- Adapt content to improve socio-cultural relevance
- Adapt content to account for level of development
  
- Other (specify) \_\_\_\_\_

**Q18. Modifications to (*name of intervention*) were made based on.... Check all that apply.**

- Consultation with the (*name of intervention*) developers
- Guidelines in the (*name of intervention*) user manual or brochure
- Teachers' experience and judgment
- Intervention animator's experience and judgment
- Other (specify) \_\_\_\_\_

**Q19. Indicate your level of agreement. Prior to implementing (*name of intervention*)...**

	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
Training was provided to intervention animators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Methods to collect evaluation data were developed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Indicators were developed to evaluate the impact of the ( <i>name of intervention</i> )	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The ( <i>name of intervention</i> ) was pilot tested in a small group of students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q20. Was there someone who advocated strongly for the intervention and supported its implementation despite barriers?**

- No → Go to Q22
- Yes

**Q21. Please indicate their job title(s). Check all that apply.**

- School principal

- Vice principal
- Homeroom teacher
- Other teacher (specify specialty) \_\_\_\_\_
- Special education staff (specify) \_\_\_\_\_
- Health professional staff (specify job title) \_\_\_\_\_
- Professional staff (specify) \_\_\_\_\_
- Parent(s)
- Member of your Schoolboard (specify) \_\_\_\_\_
- Member of a community organization
- Other (specify) \_\_\_\_\_

*The following questions pertain to the delivery of (name of intervention) to the students in your school during the first year.*

**Q22. What was your role during the implementation of (name of intervention)? Indicate all that apply.**

- Animator delivering the intervention to students
- Member of the implementation team
- Leader of the implementation team
- No direct role during the implementation
- Other (specify) \_\_\_\_\_

**Q23. (Name of intervention) animators were... Check all that apply.**

- Homeroom teachers
- Other teachers (provide specialty) \_\_\_\_\_
- Student-peers
- School health professionals (e.g. nurse, dental hygienist, etc.)
- Other (specify) \_\_\_\_\_
  
- External health professionals (e.g. physician)
- Members of a community organization (specify) \_\_\_\_\_
- CEGEP or university students
- Other (specify) \_\_\_\_\_

} → Go to Q24A

} → Go to Q24B

**Q24A. How difficult was it for (name of intervention) animators to...**

	Very easy	Easy	Neither easy nor difficult	Difficult	Very difficult
Acquire the skills needed to deliver the (name of intervention)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Solve problems related to the (name of intervention)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Deliver ( <i>name of intervention</i> ) as it was intended by the intervention developers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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→ Go to Q25

**Q24B. Indicate your level of agreement. (*Name of intervention*) animators...**

	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
Had the skills required to deliver the ( <i>name of intervention</i> )	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Could solve problems related to the ( <i>name of intervention</i> )	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Worked well with the students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Understood the school context enough to modify the ( <i>name of intervention</i> ) appropriately	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Understood the concept of delivering an intervention with fidelity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Were enthusiastic about the ( <i>name of intervention</i> )	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q25. Did (*name of intervention*) change during its implementation? (*Name of intervention*)...**

- Did not change at all → Go to Q28
- Underwent minor modifications
- Underwent major modifications
- Changed completely
- Don't know. An external agency implemented the intervention in our school → Go to Q28

**Q26. During (not prior to) implementation, did your school do any of the following to modify (*name of intervention*)? Check all that apply**

- Change objectives
- Change instructional format
- Change sequence of activities
- Change frequency of delivery
- Change duration of delivery
  
- Add relevant role models/speakers

- Add real-life examples
- Add local evidence or data
- Incorporate additional resources
  
- Remove resources that were not available at the school (e.g. workbooks, laptops, etc.)
- Remove content
- Eliminate activities deemed less critical
  
- Adapt wording/expression
- Translate
  
- Update content
- Adapt material/equipment
- Adapt content to improve socio-cultural relevance
- Adapt content to account for level of development
  
- Other (specify)

**Q27. Modifications to (*name of intervention*) during implementation were made based on.... Check all that apply.**

- Consultation with the (*name of intervention*) developers
- Guidelines in the (*name of intervention*) user manual or brochure
- Teachers' experience and judgment
- Intervention animator's experience and judgment
- Other (specify)

**Q28. Did any of the following changes occur in your school as a result of implementing (*name of intervention*)?**

	No	Yes
Changes to the social environment (e.g. increased supervision, emotional support for the students, development of relaxation areas, etc.)	<input type="radio"/>	<input type="radio"/>
Changes to school infrastructure (e.g. bicycle racks)	<input type="radio"/>	<input type="radio"/>
Update of teachers' roles and responsibilities	<input type="radio"/>	<input type="radio"/>
Addition of health-promoting interventions	<input type="radio"/>	<input type="radio"/>
Addition of extra-curricular activities	<input type="radio"/>	<input type="radio"/>
Modification/termination of other health-promoting interventions	<input type="radio"/>	<input type="radio"/>
Addition of equipment	<input type="radio"/>	<input type="radio"/>

Revision of school policy or addition of new school policy	<input type="radio"/>	<input type="radio"/>
Other (specify)	<input type="radio"/>	<input type="radio"/>

It is too early to know if changes have occurred

**Q29. Did your school do any of the following to evaluate *(name of intervention)*?**

	No	Yes
Hold regular meetings	<input type="radio"/>	<input type="radio"/>
Obtain feedback from the <i>(name of intervention)</i> animators	<input type="radio"/>	<input type="radio"/>
Document the extent to which implementation was carried out in accordance with the plan	<input type="radio"/>	<input type="radio"/>
Document the number of students participating in the <i>(name of intervention)</i>	<input type="radio"/>	<input type="radio"/>
Document the barriers and facilitators to implementation	<input type="radio"/>	<input type="radio"/>
Formally evaluate the outcomes of the <i>(name of intervention)</i>	<input type="radio"/>	<input type="radio"/>
Other (specify)	<input type="radio"/>	<input type="radio"/>

**Q30. Indicate your level of agreement.**

	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
Animators enjoyed working on the <i>(name of intervention)</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>(Name of intervention)</i> helped strengthen partnerships with community organizations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Abandoning the <i>(name of intervention)</i> had/would have a negative effect on the students.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<i>(Name of intervention)</i> has had a positive impact on students	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Schoolboard supports the continuation of the ( <i>name of intervention</i> )	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
( <i>Name of intervention</i> ) had unexpected consequences (positive or negative) on health and/or behavior.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Please explain: _____					
( <i>Name of intervention</i> ) met all objectives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q31. Was the schoolboard involved in the implementation of the intervention?**

- No → Go to Q33
- Yes (specify how: \_\_\_\_\_ )

**Q32. If yes, indicate your level of agreement. The schoolboard...**

	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
Helped solve problems related to the ( <i>name of intervention</i> )	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q33. How permanent do you think the (*name of intervention*) is at your school?**

- Very permanent (as long as it remains relevant)
- Moderately permanent (more or less)
- Not at all permanent → Go to Q35

**Q34. Is (*name of intervention*) explicitly written in your school's orientations (e.g. the educational project, the success plan or others)?**

- No
- Yes

**Q35. Indicate the level of difficulty. In this school how difficult is it for the principal to...?**

Very easy	Easy	Neither easy nor difficult	Difficult	Very difficult
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Demonstrate leadership for change	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Establish a climate of openness to innovation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ensure that instructional goals are clearly communicated to everyone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Securing resources for health-promoting interventions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Foster respect	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Establish a safe and orderly school environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Guide the staff in the process of solving problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## RESPONDENT CHARACTERISTICS

### Q36. Are you...

- Female
- Male

### Q37. How old are you?

- ≤ 30
- 30 - 40
- 40 - 49
- 50 - 59
- ≥ 60

### Q38. What is the highest level of education that you have completed?

- Bachelor's degree (specify field of study) \_\_\_\_\_
- Graduate diploma or certificate (specify field of study) \_\_\_\_\_
- Master's (specify field of study) \_\_\_\_\_
- PhD (specify field of study) \_\_\_\_\_
- Other (specify) \_\_\_\_\_



**Q39. How many years have you been working in your current position?**

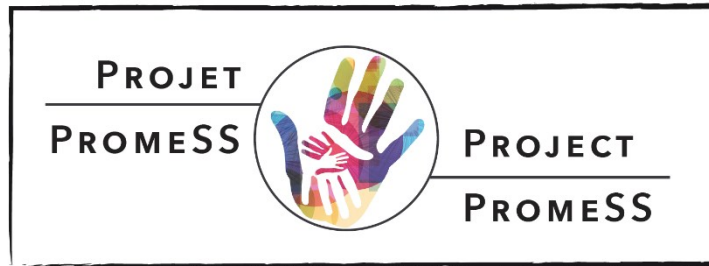
- Less than 1
- 1-3
- 4-6
- 7-9
- $\geq 10$

**Q40. How many years of experience do you have working as a  ?**

- Less than 1
- 1-3
- 4-6
- 7-9
- $\geq 10$

**THANK YOU!**

## Appendix B. PromeSS Protocol



## Investigating Social Disparities in School-Based Health-Promoting Programming

### Investigators

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Ministère de la Santé  
et des Services  
sociaux

Québec



Direction générale  
de la santé publique



Canadian Cancer Society  
Société canadienne  
du cancer

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CRCHUM  
CENTRE DE RECHERCHE

Université  
de Montréal

INSPQ  
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DE SANTÉ PUBLIQUE  
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PROPEL  
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HEALTH IMPACT

## **ABSTRACT**

There is strong evidence that behaviors including tobacco, alcohol and drug use, poor dietary habits and physical inactivity relate to chronic disease, and that these behaviors can manifest early in life. Schools are highly influential in the lives of children, and can be centrally important in helping youth develop healthy behaviors. However, schools face challenges in educating young people within a health-promoting framework, especially today with the rising popularity of electronic cigarettes, the upcoming legalization of marijuana, and increasing health inequalities. The primary objective of this study is to describe social disparities in health-promoting interventions in Québec schools. While this study encompasses all school-based health promoting interventions, we place emphasis on tobacco control interventions that address combustible and electronic cigarettes.

To address the objectives, we will undertake a cross-sectional survey of principals or vice-principals and one school staff member in all 469 high schools and a random selection of 904 of the 1,807 elementary schools across Quebec. Our pilot work indicates that principals are involved in adopting interventions, but implementation is often spearheaded by another staff member. Thus, the survey includes two 30-minute telephone interviews - one based on a questionnaire that focuses on the adoption of a health-promoting intervention that was implemented in the school in the past 3 years (termed the reference intervention) and is to be completed by the school principal, and the second focuses on implementation to be completed by a staff member with firsthand knowledge on implementing the reference intervention. \$100 will be offered to each school to cover the costs of data collection.

To help interpret the survey results from the schoolboard perspective, schoolboards will be asked to nominate an employee who is knowledgeable about scaling-up health-promoting interventions in schools in their jurisdiction. Telephone interviews with these individuals will be conducted by a researcher with extensive experience in qualitative research.

All data will be entered into an electronic database which will be kept completely confidential. No nominal information on participants will be recorded on the data collection forms. Group analyses will be conducted to prevent identification of schools and schoolboards, and no school or schoolboard will be named in publications. None of the schoolboard or school staff, parents or students will have access to these data. Verbal consent will be sought from survey participants during the initial call inviting participants to participate. Written consent will be sought for taping of qualitative interviews conducted with schoolboard representatives. Participation is entirely voluntary, and participants can withdraw at any time without providing a reason, and with no consequences.

We believe that this study is critical to improving school-based health-promoting interventions, especially in disadvantaged neighborhoods, which in turn will contribute to improving the health and educational outcomes of Québec students. At the end of the study, a written report will be submitted to each schoolboard. This project was approved by the Center hospitalier de l'Université de Montréal Ethics Committee.

## 1. BACKGROUND

Chronic diseases including cancer, cardiovascular disease and diabetes are epidemic globally,<sup>1</sup> and people living in socially or economically disadvantaged circumstances have a higher risk of death from chronic disease. There is strong evidence that behaviors such as tobacco, alcohol and drug use, poor dietary habits and physical inactivity relate to chronic disease, that these behaviors often manifest early in life,<sup>2</sup> and that there are social gradients in the prevalence of these risk factors even early in life. While the family is key in helping children and adolescents develop healthy lifestyle habits, schools are also highly influential.<sup>2,3</sup> School-based health-promoting interventions are of great interest from a public health perspective because all young people attend and spend a great deal of time in school.<sup>4,5,6</sup> Because of this broad reach, school-based interventions have the potential to influence health behaviors across widely diverse populations including those that are disadvantaged.

Because of the link with chronic disease, searching for the causes of social disparities in risk behaviors in children and adolescents is a public health priority. One plausible cause is differential availability of or access to effective school-based health-promoting interventions. Further, existing interventions that use a “one size fits all” approach may not be optimally adapted in schools serving disadvantaged students, and therefore perceived as not useful by school staff.<sup>7</sup> Indeed, a recent systematic review of the impact of smoking interventions on inequity in youth<sup>8</sup> reported that only two of five school-based interventions were equally effective in disadvantaged schools. A third intervention was more effective among more advantaged youth, and the remaining two had mixed or unclear impact on inequity.<sup>8</sup> Therefore, school-based interventions may need to be adapted to the specific context of the school to be effective.

Numerous factors influence the availability of well-adapted school-based health-promoting interventions. Among others, staff working in schools serving disadvantaged youth may encounter urgent problems daily, which precludes investing time in health-promoting programming.<sup>9,10</sup> Working with community stakeholders is key in school-based programming,<sup>11</sup> but collaborative partnerships can be demanding<sup>12</sup> and schools may vary in their ability to draw benefit from such relationships.<sup>13</sup> Although parental involvement is associated with the effectiveness of prevention programming,<sup>6</sup> schools serving disadvantaged populations may have more difficulty engaging parents, which can impact the availability of health-promoting interventions. Finally, budgets may not be available to support what may be viewed as non-essential programming.

Publications on the effectiveness of school-based health-promoting interventions are abundant and support that scaling up effective interventions, or at least components of interventions shown to be effective, is an appropriate course of action from a public health perspective. However, little is known about disparities across schools in health-promoting interventions in terms of adoption, adaptation, implementation or sustainability. Increased understanding of each of these phases is fundamental to better understanding social disparities in school-based health-promoting interventions. The proposed research will address these knowledge gaps.

## **2. OBJECTIVES**

- (i) To determine if, in Québec elementary and high schools, there are social disparities in:
  - the presence and/or types of health-promoting interventions
  - the process of adopting health-promoting interventions
  - adaptation of health-promoting interventions
  - barriers and facilitators to implementing health-promoting interventions
  - the sustainability or the process of achieving sustainability of health-promoting interventions. In this protocol the notion of sustainability will be represented as “perceived permanence”
- (ii) to describe barriers and facilitators to scale up of health-promoting interventions from the schoolboard perspective

## **3. CONCEPTUAL MODEL**

Based on an extensive literature review, we developed a conceptual model to depict the complex processes involved in implementing school-based programs (Appendix 1). Our model draws on Rogers’ Diffusion of Innovations Theory<sup>14</sup> and was adapted to reflect the Québec context. The *PromeSS* Model depicts four phases: adoption, implementation, sustainability and scale-up. Adoption is viewed as involving the identification of a need to address a certain health issue in the student population, and matching the school’s characteristics to a candidate intervention. Implementation is the process by which the intervention is delivered to students and may involve adapting the intervention to suit the school context, training animators to deliver the intervention, and monitoring/evaluating outcomes. Sustainability involves a plan to integrate the intervention into the school thereby achieving permanent status. Finally, scale-up involves delivering the intervention to a wider segment of the student population or in other schools.

## **4. METHOD**

To address the study objectives, we will conduct a cross-sectional survey of school principals or vice-principals and one school staff member (with firsthand knowledge of the implementation of health-promoting interventions) per school in a representative sample of elementary schools and in all high schools in Québec. In addition, to obtain qualitative data from a schoolboard perspective, a representative, from each of the 69 schoolboards with knowledge of school-based health-promoting interventions, will be interviewed by a researcher with expertise in qualitative interviewing methods.

### **4.1 Study Population**

*Survey:* All 1,807 elementary schools and 469 high schools will comprise the sample. Private schools are excluded because the process by which interventions are adopted and implemented likely differs between private and public schools. Specialized schools that do not issue high school leaving diplomas are also excluded. All schools with at least 30 students in 69 (of 72) schoolboards across Québec, have been ranked according to two deprivation indicators.<sup>15,16</sup> The first, “l’indice de seuil de faible revenu (SFR)”, is based on the proportion of families living below a low-income threshold that varies by geographical location and population density. The second indicator, “l’indice de milieu

socioéconomique (IMSE)”, is a composite of the proportion of families with a mother who did not complete secondary school, and with a parent who is inactive in the workforce. Schools with fewer than 30 students which are not assigned a deprivation indicator by the Ministère de l’Éducation et de l’Enseignement supérieur (MEES) are excluded. A response proportion in the range of 66% is anticipated.

*Qualitative component:* Each schoolboard will be asked to identify one schoolboard representative who is knowledgeable about the history of adoption, implementation and scaling-up of health-promoting interventions in the schools in their jurisdiction.

#### **4.1.1 Recruitment**

*Survey:* We will seek permission from the 69 schoolboards to contact principals in elementary and high schools in their jurisdictions. An invitation letter with the study protocol, questionnaires, completed application forms, ethics certificate, and application fee (if applicable) will be sent to each schoolboard, and the research team will present the project to the schoolboard’s Board of Directors if required. After acceptance by the schoolboard, Sector Directors or individuals in equivalent positions will be contacted by mail to inform them of the schoolboard’s approval, to describe the project, and to encourage them to communicate their endorsement of the study with school principals (Appendix 2). One week later, a letter of introduction will be sent to school principals describing the project and advising them of upcoming contact by a research team member. (Appendix 3) Allowing sufficient time for receipt of the introductory letter, interviewers will telephone school principals during school hours to confirm their eligibility (i.e., that they have worked in their current school longer than 6 months) and to solicit participation (Appendix 4). Principals who are not eligible or who decline to be interviewed, will be asked to nominate the vice principal or another staff member to complete the interview. After verbal consent is obtained, a telephone interview will be scheduled at a time that is most convenient (before, during or after school hours). The principal will then be emailed confirmation of the interview date and time. A maximum of 5 attempts will be made to contact school principals. After completing the interview, principals will be asked to nominate a school staff member to complete a second interview (principals may choose to complete the second interview themselves). Contact information for nominated staff members will be obtained and these individuals will be recruited using the same method as school principals. Schools that choose not to participate will receive a short questionnaire of six questions (to complete if they wish) which will allow to validate the recruitment sampling. To cover costs associated with data collection, \$100 will be offered to each participating school.

*Qualitative component:* A member of the research team will communicate with each schoolboard to obtain the name and contact information of one potential schoolboard representative. A letter of introduction describing the study will be sent to schoolboard nominees (Appendix 5), and one week later, they will be contacted by telephone to obtain consent (Appendix 6) and to schedule a time for the interview.

Recruitment of schools will begin March 2017 and data collection will end June 2018 with interviews scheduled throughout that entire period.

#### **4.1.2 Data collection**

*Survey:* Our pilot work indicates that principals are involved in adopting school-based health-promoting interventions, but implementation is often spearheaded by another staff member. Thus, the survey includes two interviews - one based on a questionnaire (Appendix 7a/7c) that focuses on the adoption of a health-promoting intervention that has been delivered in the school in the past 3 years (termed the reference intervention) and is to be completed by the school principal, and the second focuses on implementation (Appendix 7b/7d) to be completed by a staff member with firsthand knowledge on implementing the reference intervention. The reference intervention will comprise an activity, class or special event aimed at students and is:

- (i) not part of the Ministry-mandated curriculum
- (ii) offered in the school timetable such that participation is expected at the group, class, grade or school-level
- (iii) approved by the Governing Board (optional)
- (iv) focused on smoking, alcohol or substance use, healthy eating, physical activity, injury prevention, oral health, sex education, mental health, or intimidation and aggressive behavior.

School principals will receive a copy of the questionnaire prior to the 30 minute telephone interview to allow for preparation and consultation with colleagues. Random monitoring of interviews by the study investigators will be conducted for quality control.

*Qualitative component:* A 45-minute qualitative telephone interview will be conducted with the schoolboard representative by a senior researcher (Dr. Natalie Kishchuk, Program Evaluation and Beyond Inc.). The interview will cover two topics:

- (i) Adoption/implementation: the 10-year history of school-based health-promoting interventions in the schoolboard to establish the characteristics of the interventions implemented, types of adaptations to the interventions before or during implementation, and any “stories” of success or failure including barriers and facilitators
- (ii) Scale-up: the 10-year history of scaling up school-based health-promoting interventions including expectations of what scale up entailed, stages of scale up, and barriers and facilitators to scaling up.

Additional qualitative questions will be generated based on preliminary analyses of the data collected as part of the school survey. Interviews will be digitally-recorded and the content coded for analysis. Although recording is important to ensure that answers are captured in the representatives’ own words and for detailed analysis, schoolboard representatives will be offered the opportunity to decline recording. In this case the interviewer will take detailed notes.

#### **4.1.3 Study variables**

The study variables are based on the *PromeSS* Conceptual Model. Criteria for inclusion of variables in the questionnaires included: how central the variable is to the objectives, existence of a question to measure the variable, and judgement as to our ability to formulate a question *de novo* to measure the variable with validity and reliability.

#### **4.1.4 Data analysis**

*Survey:* The existence and types of health-promoting interventions will be compared across schools categorized by the deprivation indicators. Similarly, our indicators of adoption, implementation and sustainability will be compared across school deprivation indicators. Separate multivariate analyses will assess the independent association between the indicators of school deprivation and each outcome of interest, controlling for potential confounders.

*Qualitative component:* Interview data will be synthesized into a 5-10-page case report on scaling up school-based health-promoting interventions for each schoolboard. Case reports will be returned to the representatives for factual validation. A collective analysis across all case reports will be performed, with the intent of defining determinants of scale up in disadvantaged versus advantaged school settings.

### **5. CONFIDENTIALITY**

All data collected in this study will be kept completely confidential. No nominal information on participants will be recorded on the data collection form. Prior to data entry, the names of schoolboards and schools will be removed from the data collection form and replaced with a randomly generated identification number. Similarly, the names of schoolboards will be removed from interview notes/recordings created during the qualitative interviews and replaced with a randomly generated identification number. A single copy of a master list containing the names of schools and schoolboards, and the corresponding identification numbers will be kept under lock and key. Only the principal investigator, Dr. O'Loughlin, and the project coordinator will have access to the master list. Group analyses will be conducted to prevent identification of schools and schoolboards, and no school or schoolboard names, or other unique characteristics, will be included in publications or scientific presentations. No anonymized responses in verbatim quotes may be cited in publications to illustrate research findings without schoolboard representative consent. None of the schoolboard or school staff, parents or students will have access to these data.

### **6. DATA MANAGEMENT**

All data will be coded and stored in a password protected database. A copy of the survey database, electronic files, audio recordings or interview notes from qualitative interviews will be stored in a secure archive room or password protected computer under the responsibility of the principle investigator. All data will be preserved for 10 years to allow for verification of quality then destroyed in accordance with CRCHUM standards.



## **7. ETHICS**

Ethics approval was obtained from the CHUM Ethics Review Committee in Nov 2016. The CHUM certificate of ethics approval will be submitted to all 69 schoolboards (and to school principals if requested). Schools in schoolboards without a research or ethics committee fall under the purview of the CHUM ethics approval.

## **8. SIGNIFICANCE**

Reducing health inequalities is a top priority of the Ministère de la Santé et des Services sociaux du Québec. Health-promoting preventive interventions early in life can encourage the development of healthy lifestyle behaviors that can track into adulthood, and a key intervention milieu is schools. Offering top-notch health-promoting interventions in schools is a key strategy to address health disparities in Québec, and the data collected in this innovative study will pinpoint as yet unknown barriers and facilitators in implementing effective interventions in schools serving disadvantaged students. We believe that this research is essential to inform the design of more effective school-based health-promoting interventions, which will ultimately improve the health and academic outcomes of Québec students.<sup>17</sup>

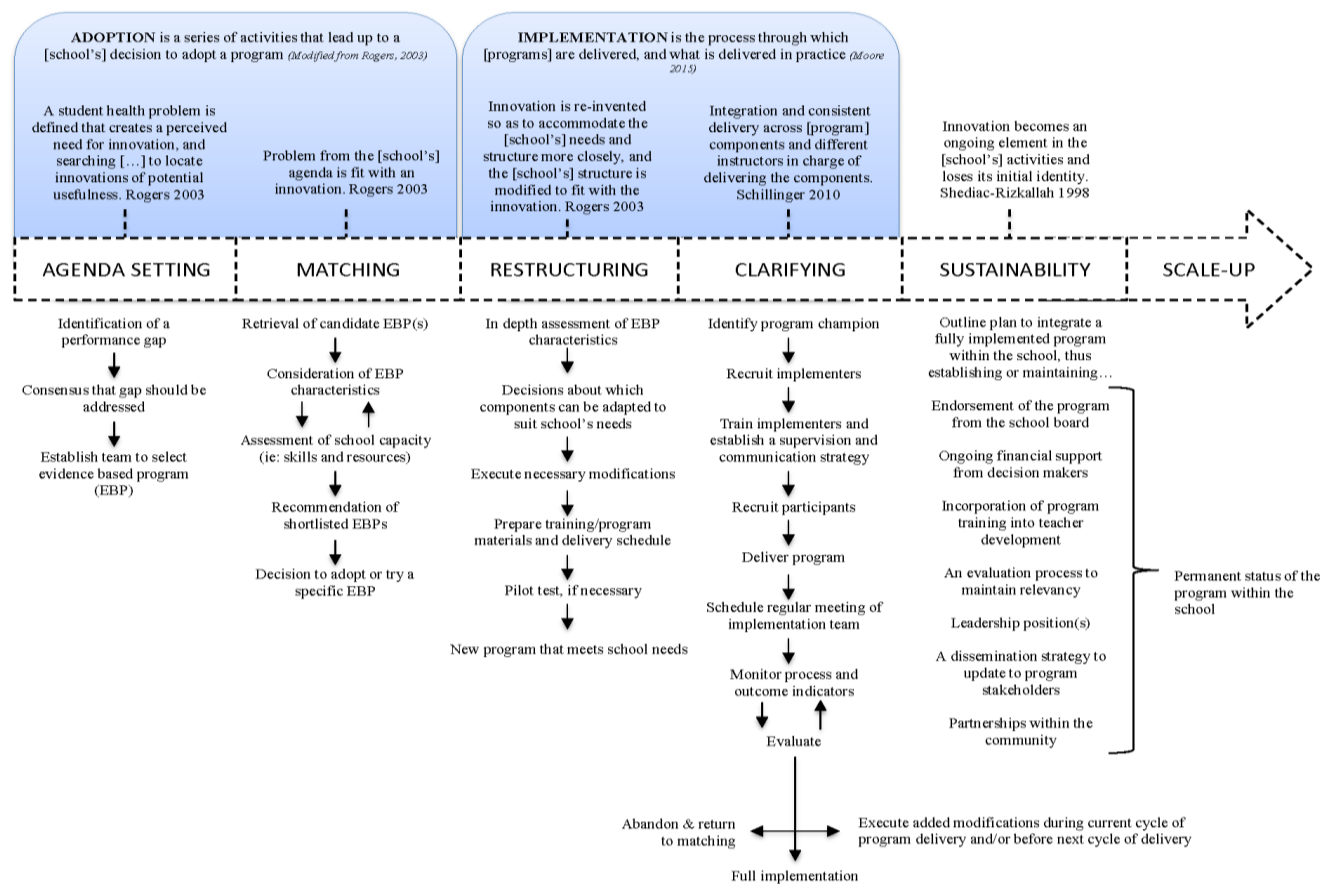
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## Appendix 1. *PromeSS* Conceptual Model of the innovation process as it pertains to a school-based health-promoting intervention



## Appendix 2: Letter of Introduction to Sector Directors

Date, 2017

*Name*

Sector Director

Schoolboard

Address

Montréal (Québec)

Re: *Investigating Social Disparities in School-Based Health-Promoting Programming: Project PromeSS*

Dear *Name*,

Recently, our research team obtained permission from your Schoolboard to recruit elementary and high school principals to participate in a research project funded by the Ministère de la Santé et des Services sociaux du Québec and the Canadian Cancer Society called: “*Investigating Social Disparities in School-Based Health-Promoting Programming: Project PromeSS*”. This study is led by Dr. Jennifer O’Loughlin at the Centre de Recherche du Centre Hospitalier de l’Université de Montréal (CrCHUM), who has extensive experience conducting school-based research. A one-page summary of the project is provided for your information.

As part of this study we will contact 2,276 principals in Québec to conduct two 30 minute telephone interviews: one regarding the adoption of health-promoting interventions in their school. A second interview will be undertaken with a staff member nominated by the school principal (or with the principal him/herself), and will collect data on the implementation of a specific health-promoting intervention that has been delivered in the school in the past 3 years. Interviews will be scheduled at a time most convenient for the participants (before, during or after school hours) between June 2017 and June 2018. Schools that choose not to participate will receive a short questionnaire of six questions (to complete if they wish) to help validate the recruitment sampling. To cover the costs of data collection, we are offering \$100 to each school that participates.

This project will permit better understanding of how schools serving students from different social and economic backgrounds choose, adopt and implement health-promoting interventions. We believe that these data are essential to informing the design of highly relevant and effective interventions, which will ultimately improve the health and academic outcomes of Québec students. Your support would be greatly beneficial in the recruitment process and we are writing to you in the hope that you would consider communicating this support to the school principals in your sector. Should you decide to do so, we also attach a template for an email that may facilitate this communication. A member of the research team will contact you in the next few days to discuss the project and answer any questions you might have.

We look forward to speaking with you and hope that you can work with us in this important endeavour.

Yours sincerely,

Jennifer O'Loughlin, PhD  
Principal Investigator, *Project PromeSS*  
Professor, University of Montréal School of Public Health  
Canada Research Chair in the Early Determinants of Adult Chronic Disease  
Centre de Recherche du Centre Hospitalier de l'Université de Montréal (CrCHUM)  
Email : Jennifer.OLoughlin@umontreal.ca

Hartley Dutczak, MSc  
Project Coordinator, *Project PromeSS*  
Centre de Recherche du Centre Hospitalier de l'Université de Montréal (CrCHUM)  
Tel: (514) 890-8000, extension 31455  
Email: Hartley.Dutczak.chum@ssss.gouv.qc.ca.

### Appendix 3: Letter of Introduction to School Principals

Date, 2017

*Name of Principal*

Name of School

Address

Montréal (Québec)

Re: “*Investigating Social Disparities in School-Based Health-Promoting Programming: Project PromeSS.*”

Dear *Name*,

We are writing to you today to solicit your participation in a research project funded by the Ministère de la Santé et des Services sociaux du Québec and the Canadian Cancer Society called: “*Investigating Social Disparities in School-Based Health-Promoting Programming: Project PromeSS.*” This project will permit better understanding on how schools serving students with differing social and economic backgrounds adopt and implement school-based health-promoting interventions, and the results will inform the design and dissemination of these programs. The study is led by Dr. Jennifer O’Loughlin at the Centre de Recherche du Centre Hospitalier de l’Université de Montréal (CrCHUM), who has extensive experience conducting school-based research and has been approved by the CHUM ethics committee. A one-page summary of the project is provided for your information.

You are among 2,276 school principals from across Québec whom we are contacting to participate. Your participation would comprise a 30 minute telephone interview on how your school *adopts* health-promoting interventions, and then nomination of a staff member (or yourself) to complete another 30 minute interview on how your school *implements* these interventions. Interviews will be scheduled at a time that is most convenient for you (before, during or after school hours). Schools that choose not to participate will receive a short questionnaire of six questions (to complete if they wish) to help validate the recruitment sampling. We are offering \$100 to each school that participates to cover the cost of data collection.

Please be assured that your participation is entirely voluntary and that any information you provide will be kept strictly confidential. The data collected will not be nominative and group analyses will not permit identification of a specific school or schoolboard. The data will be used for research purposes only, and managed and protected to prevent its loss or unauthorized disclosure. You can choose to stop participating at any time, without providing a reason, and with no consequences.

A member of our research team will contact you in the next few days to discuss your school's participation and to answer any questions that you might have. Your insight is critical to the success of this project and we sincerely hope you will agree to participate.

Jennifer O'Loughlin, PhD  
Principal Investigator, *Project PromeSS*  
Professor, University of Montréal School of Public Health  
Canada Research Chair in the Early Determinants of Adult Chronic Disease  
Centre de Recherche du Centre Hospitalier de l'Université de Montréal (CrCHUM)  
Email : Jennifer.OLoughlin@umontreal.ca

Hartley Dutczak, MSc  
Project Coordinator, *Project PromeSS*  
Centre de Recherche du Centre Hospitalier de l'Université de Montréal (CrCHUM)  
Tel: (514) 890-8000, extension 31455  
Email: Hartley.Dutczak.chum@ssss.gouv.qc.ca.



#### Appendix 4: Invitation (Verbatim) to School Principals/Vice Principals

Hello *Name*. My name is \_\_\_\_\_. I am calling in regards to Project PromeSS, a study funded by the MSSS and the the Canadian Cancer Society, and conducted from the Centre de recherché du Centre hospitalier de l'Université de Montréal.

I am following up on a letter that was sent to you recently describing our research project and inviting you to participate. Did you have a chance to read the letter?

*If the person has read the letter...*

We thank you for taking the time to do so. Do you have any questions? Is there any aspect that needs clarification? Would you agree to participate?

*If we have support from the sector director:* We also had the opportunity to speak with your Sector Director, *Name*, who was very supportive of the project.

*If the person did not read the letter...*

Is it possible to take a few moments to discuss the project now?

RESPONSE #1: No not really

Would it be possible to schedule a 5 minute appointment to do so?

RESPONSE #2: Yes

Excellent. Your schoolboard recently provided us permission to recruit principals in the \_\_\_\_\_ territory. The goal of the province-wide study is to better understand the barriers and facilitators to adoption and implementation of health-promoting interventions in elementary and high schools and to describe how these barriers and facilitators may change in different socioeconomic contexts.

The type of interventions that we are interested in include: tobacco prevention, healthy eating, physical activity, injury prevention, mental health, prevention of substance abuse, etc. that were implemented in your school in the last 3 years. These interventions can be activities, classes, special events that are not part of the Ministry mandated curriculum but require that all students (whether it is in one class, one grade, or in the entire school) attend.

We will be contacting all high schools and a representative sample of elementary schools.

Participation in our study entails completing a 30 minute confidential telephone interview, and nominating a school staff member who has been involved in implementing such an intervention to complete a second 30 minute telephone interview.

Interviews will be scheduled at a time most convenient for you (before, during or after school hours) between June 2017 and June 2018. We are offering \$100 to each school that participates.

All information you provide will be kept strictly confidential which means your responses will not be shared with your schoolboard, colleagues or parents. Analyses will be conducted at the group level so that no one school can be identified. Participation is entirely voluntary and you can stop at any time.

*If the person agrees to participate ...*

Thank you very much. To be eligible we require that all principals be in their current positions for at least 6 months. Is this consistent with your situation?

*If the person is eligible ...*

Perfect, can we set a time for the interview, at your convenience?

SET TIME/DATE. Is it possible to obtain your email address? This will be used to confirm the date and to send any necessary documentation. In the meantime please do not hesitate to contact me for any question or concern. My phone number is (514) 890-8000, ext. xxxxx. Thank you again and have a good day!

*If the person is not eligible ...*

Does your school have a vice principal or other staff member involved in the adoption of a health-promoting intervention to participate in the telephone interview in your place?

*If the person refuses to participate-*

Ok, I thank you for your consideration. In order to allow us to compare our sample of participating schools to all schools in Quebec would you be willing to answer 6 questions on certain characteristics of your school. This can be done now over the phone or I could send you this brief questionnaire to complete electronically. Goodbye and have a nice day!

*If the person wants to appoint the vice-principal or another member of the staff to participate in the telephone interview ...*

Excellent - thank you very much! Would you be willing to provide us with the name, number and e-mail address of this person, so that we could contact them? When would you recommend that we try to get in touch with \_\_\_\_\_ (*name of nominee*) so that you have enough time to speak with him/her.....

*Introduction to the vice-principal...*

Your Principal (their name) recommended you as the best person to be interviewed for a study we are currently conducting on the health promoting interventions offered in Quebec.

## Appendix 5: Letter of Introduction to Schoolboard Representative for Qualitative Interviews

Date  
Name of representative  
Schoolboard  
Address  
Montréal (Québec)

Re: “*Investigating Social Disparities in School-Based Health-Promoting Programming: Project PromeSS.*”

Dear *Name*,

Recently our research team obtained permission from your schoolboard to recruit a representative to participate in a research project funded by the Ministère de la Santé et des Services sociaux du Québec and the Canadian Cancer Society, called: “*Investigating Social Disparities in School-Based Health-Promoting Programming: Project PromeSS.*” This study is led by Dr. Jennifer O’Loughlin at the Centre de Recherche du Centre Hospitalier de l’Université de Montréal (CrCHUM), who has extensive experience conducting school-based research. As part of this project we will be contacting all high schools and a representative sample of elementary schools across Québec. The aim is to increase understanding on how schools adopt and implement health-promoting interventions, and obtaining schoolboard perspective on these processes is an integral part of this research. The study was approved by the CHUM ethics committee.

(i) You have been identified as the person most knowledgeable about health-promoting interventions delivered in (*name of schoolboard*) schools over the past 10 years and therefore the best person to participate. This would involve you being interviewed over the telephone by a researcher with expertise in qualitative interviewing. This interview will last 45 minutes and will focus on the history of school-based health-promoting interventions in the schoolboard and how your schoolboard scales up interventions across schools.

(ii)

(iii) Please be assured that your participation is entirely voluntary and that any information that you provide will be kept strictly confidential, used for research purposes only, and managed and protected to prevent its loss or unauthorized disclosure. You can choose to stop participating at any time without providing a reason and with no consequences. A member of our research team will contact you in the next few days to discuss the project, answer any questions you might have, and arrange a time for the interview if you accept to participate.

We sincerely hope that you are will accept to participate. Your opinions and comments are critical to the success of this project.

Jennifer O'Loughlin, PhD  
Jennifer O'Loughlin, PhD  
Principal Investigator, *Project PromeSS*  
Professor, University of Montréal School of Public Health  
Canada Research Chair in the Early Determinants of Adult Chronic Disease  
Centre de Recherche du Centre Hospitalier de l'Université de Montréal (CrCHUM)  
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Email: Hartley.Dutczak.chum@sss.gouv.qc.ca

## **Appendix 6: Information provided to Schoolboard Representatives regarding the qualitative interview**

*Investigating Social Disparities in School-Based Health-Promoting Programming: Project PromeSS*

### **Purpose of Interview**

Given your knowledge of the types of health-promoting interventions offered in the schools in (name of Schoolboard) territory as well as the history of adoption, implementation and scaling up of these interventions, you are being asked to participate in an interview. Your participation is completely voluntary.

If you have any questions concerning the study, please contact Ms Hartley Dutczak at 514-890-8000 ext. 31455; [Hartley.Dutczak.chum@ssss.gouv.qc.ca](mailto:Hartley.Dutczak.chum@ssss.gouv.qc.ca). If you have questions pertaining to the interview, please contact Dr. Natalie Kishchuk at [redacted phone number], [redacted email].

### **Benefits and Potential Benefits of Participation**

Interview data will be synthesized into a 5-10-page case report on scaling up school-based health-promoting interventions for each schoolboard. Prior to finalization, the case report will be returned to you for factual validation.

### **Inconveniences**

The interview will last approximately 45 minutes and will be scheduled at a time most suitable to you to minimize any inconvenience.

### **Payment**

There will be no payment for your participation in this interview.

### **Withdrawal**

You may terminate the interview at any time. You can refuse to answer any specific question at any time.

### **Recording**

Although recording is important to ensure that answers are captured in the representatives' own words and for detailed analysis, you will be offered the opportunity to decline recording. In this case the interviewer will take detailed notes.

### **Protection of Personal Information**

All information that you provide will be kept completely confidential. Names of schoolboards will be removed from digital recordings or paper/electronic notes and replaced with a randomly generated identification number. A single copy of a master list containing the names of schoolboards and the corresponding identification numbers will be kept under lock and key. Only the principal investigator and the project coordinator will have access to the master list. Digital recordings or interview notes will be stored in a secure archive room or password protected computer. All data will be preserved for 10 years to allow for verification of quality

then destroyed in accordance with CRCHUM standards. If you consent, anonymized responses in verbatim quotes may be cited in publications to illustrate research findings. A collective analysis across all case reports will be performed, with the intent of defining determinants of scale up in disadvantaged versus advantaged school settings. **Individual responses provided during interviews will not be published, but presented in aggregate form in the report and in scientific presentations.**

**Informed Consent**

I have read and understood the information provided in this document. I certify that this information has been explained to me verbally, that I was given the opportunity to ask questions concerning this project and that these questions were answered to my satisfaction. I certify that I was provided the time needed to make my decision. I understand that participation in this study is voluntary and that I am free to withdraw at any time without any consequence or prejudice of any kind. **Signing below indicates that I am freely willing to participate in this interview.**

- I accept that the interview is digitally recorded.
- I consent to citation of my anonymized responses in verbatim quotes OR
- I do not wish any of my responses to be used in verbatim quotes.

---

(Name of Participant) (Signature of Participant) (Date)

**PLEASE RETURN THE SIGNED FORM BY EMAIL TO [redacted email] or BY FAX TO [redacted phone number]**

## **Appendix C. Description of all study variables**

### ***C.1 School characteristics***

*Perceived importance of health issues* was measured by asking school informants, for each grade cycle (i.e., Kindergarten; Grade 1-2; Grade 3-4; Grade 5-6), “In the past year, how important was each of the following health issues for your [grade cycle] students?” followed by a list of 13 health issues (i.e., aggressive behavior; lack of physical activity; unhealthy eating; inadequate sleep; problems with mental health (asked only for students in grades 5-6); dental problems; lack of respect for safety; infections, viruses, parasites; attention deficit hyperactivity disorder (ADHD); problems with personal hygiene; bullying (asked only for students in grades 3-6); cigarette smoking (asked only for students in grades 3-6); concerns about puberty (asked only for students in grades 5-6)). The 13 issues were selected based on a list of health themes identified as relevant to students by the Institut national de santé publique du Québec (INSPQ), a national center of expertise in public health (Tessier and Comeau, 2017). The list was refined for wording and relevance of issues by grade cycle in collaboration with a retired school principal, and pilot-tested in a small group of school principals. Participants were instructed by the interviewers to indicate the level of importance of each health issue as it pertained to their own school context, taking into consideration whether the issue warranted special attention or intervention by school staff. The original response options included extremely important, very important, important, not very important, and not at all important. Response options were recoded for analysis as important (extremely important, very important, important) and not important (not very, not at all).

*Availability of health-promoting interventions (HPIs)* was measured by asking “In the past year, has your school offered any health-promoting interventions in which participation is expected at

the group, class, grade, or school-level to address...?”, followed by a list of eight health topics (i.e., physical activity/active living; sex education; healthy eating; bullying and exclusion; personal safety and injury prevention; mental health and well-being; oral health; tobacco control). Health-promoting interventions (HPIs) were defined in the PromeSS study as activities complementary to the educational curriculum offered to all students during class time at no cost, for which student attendance is mandatory. Response options were yes or no to each of the eight health topics.

*Number of students in the school* was measured by asking “How many students were registered in your school on September 30 [of this academic year] in...?” followed by a list of grade levels (i.e., kindergarten; grade 1; grade 2; grade 3; grade 4; grade 5; grade 6; special education classes; other). The number of students in each grade level was summed to obtain a total number of students.

*Student/teacher ratio* was measured by asking informants: “How many of the following staff members work in your school?” followed by a list of professions (i.e., teachers; professional staff; health professional staff; special education staff; support staff; daycare services staff). The total number of students in the school was divided by the number of full and part-time teachers.

*Teacher and principal turnover* were measured by asking “In the past 3 years, your school experienced teacher/principal turnover...?”. The original response options included 'several staff, some staff, few staff, no turnover in the past 3 years, and no turnover in more than 3 years. Response options were recoded for analysis as high turnover (several staff, some staff) and low turnover (few staff, no turnover in the past 3 years, no turnover in more than 3 years).



In the Québec education system, students are considered at-risk if they present factors of vulnerability that could influence their learning and behaviour and may therefore be at risk of academic failure or socialization if early preventive or corrective intervention is not provided (Ministère de l'Éducation, du Loisir et du Sport, 2007). They may need additional support and school staff may develop an individualized intervention plan to implement in collaboration with teachers, health and professional staff, and the student's family. *Proportion of students considered at-risk* was measured by asking "How many students in your school are considered at risk or EHDAA (élèves handicapés ou en difficultés d'adaptation ou d'apprentissage)?" EHDAA translates in English to SHSMLD (students with handicaps, social maladjustments or learning difficulties) and refers to students who have had a formal evaluation by special education or health professional staff. School informants were asked to provide the number of students at risk without an intervention plan and the number of students with an intervention plan, which were summed and divided by the total number of students in the school to obtain a percentage.

*Proportion of absent students per day* was measured by asking "On average, how many students in your school are absent each day? [Excluding] late arrivals or early departures." The number of absent students was divided by the total number of students in the school to obtain a percentage.

*Language of instruction* was measured by identifying each school's governing school board. Response options were French or English.

We used *Indice de milieu socioéconomique* (IMSE) scores assigned to schools for the year 2016-17 by the Ministère de l'Éducation du Québec to estimate the level of deprivation in the student

body. Using data from the most recent Canadian census, this composite score is based on each student within the school and reflects whether their mother completed high school and whether one of their parents is inactive in the workforce. Decile scores are assigned to each school with an IMSE of 10 indicating the most deprivation (Ministère de l'Éducation et de l'Enseignement supérieur, 2017). We recoded these for analysis into the same three categories used by the Ministry: schools serving students from very advantaged (IMSE 1-3), moderately advantaged (IMSE 4-7) or disadvantaged (IMSE 8-10) households.

School neighborhood-level deprivation was measured using indices of social and material deprivation developed by the Institut national de santé publique du Québec (INSPQ) (Pampalon ref) reflecting deprivation of the school neighborhood. School postal codes were matched to dissemination areas, the smallest geographical units for which 2016 Canadian Census data from Statistics Canada is available. In each dissemination area, a score for *neighborhood social deprivation* was developed based on the proportion of people living alone among those  $\geq 15$  years old; the proportion of people who are separated, divorced or widowed among those  $\geq 15$  years old; and the proportion of single-parent families. Similarly a score for *neighborhood material deprivation* was developed based on: the proportion of people without a high school diploma or equivalent among those  $\geq 15$  years old; the employment to population ratio among those  $\geq 15$  years old; and the average income of the population  $\geq 15$  years old. Values were categorized in population-weighted quintiles (i.e., five groups with approximately the same population size) from 1 (least deprived) to 5 (most deprived). We recoded quintile scores for descriptive analyses into low deprivation (1-3) and high deprivation (4-5).

Finally, rurality of the school neighborhood was measured in two way. *School neighborhood* was measured in the PromeSS questionnaire by asking informants “Which setting best describes your immediate school neighborhood?”. Response options included urban, suburban, and rural. For a more objective measure, we matched PromeSS school postal codes to dissemination areas and used the Statistics Canada-developed population centre index to assess *size of community*. Population centres are classified into four categories: rural area; small population center (population between 1,000 and 29,999); medium population center (population between 30,000 and 99,999); and large urban population center (population of 100,000 or more) (ref). We dichotomized the variable as rural/small population center and medium/large population center.

### ***C.2 Specific HPI selected for in-depth questioning***

The *specific HPI* selected by informants had to have been offered at the time of data collection or in the last three years, during class time, free for students, proposed to a large number of students (e.g., school, grade, class), for which participation was expected (i.e., not optional), and completed at least once in its entirety. Descriptions of the HPI provided by school informants were recorded in writing and supplemented with information from the HPI developer’s website, if available. Among all 171 specific HPIs reported by school informants, we selected HPIs for which respondents had indicated mental health, aggressive behaviour, bullying and/or addiction prevention as the topic or had indicated a related topic in the “other” category (e.g., conflict management, empathy, relaxation). We examined the written HPI descriptions and excluded interventions that were not designed to address mental health directly (e.g., an HPI designed primarily for physical activity that the informant classified as indirectly improving mental health).

*Health topics the HPI was designed to address* was measured by: “What aspect(s) of your students’ health and wellbeing does (name of intervention) primarily address?” followed by a list of 12 health topics (smoking prevention; tobacco control education; aggressive behaviour; mental health (e.g. anxiety), bullying (may include cyberbullying); physical activity; healthy eating; addiction prevention (e.g. alcohol, drugs, gambling); personal hygiene; puberty; personal safety and injury prevention; oral health; or other).

Characteristics of the selected HPI included: (i) *Sequenced step-by-step approach* was measured by: “(Name of intervention) was a program?” (yes, no); (ii) *Active forms of learning* was measured by: “What type of learning strategy was used for (name of intervention)?” followed by four choices including lecture strategies, individual work, interactive teaching strategies, and social constructivist teaching strategies. HPIs were coded as Yes if they used interactive or social constructivist teaching strategies; (iii) *Skill development* was measured by: “Were any of the following core competencies incorporated into (name of intervention)?” followed by ten choices including self-esteem, managing emotions and stress, positive interactions with others, self-awareness, learning to say “no”, asking for help, informed lifestyle choices, adoption of prosocial choices, management of social influences, and social engagement. HPIs were coded as Yes if they incorporated development of at least one of these competencies; (iv) *Whole school approach (targeting all grades)* was measured by: “Which grade(s) received (name of intervention)?”. HPIs were coded as Yes if all grades were selected; (v) *Whole school approach (changes to school culture and environment)* was measured by: “Were there any other initiatives occurring in your school before or around the same time as (name of intervention) that addressed the same health and wellbeing issue as (name of intervention)?” followed by seven categories including media

campaign, assemblies, extra-curricular activities, linking to services offered by external organization, infrastructure, social environment, school policy, school day care service activities, special events. HPIs were coded as Yes if at least one other initiative was offered on the topic of mental health promotion; (vi) *Family involvement* was measured by: “Were the following members of the school community included in (name of intervention): families (invited to participate)” (yes, no); (vii) *Delivery by in-school animators* was measured by: “(Name of intervention) animators were...”. HPIs were coded as Yes if animators were teachers, students or professional staff already working in the school.

Variables related to the implementation process of the selected HPI included: (i) *Coordination team for implementation* was measured by: “Who was responsible for planning how (name of intervention) would be implemented in the first year?”. HPIs were coded as Yes if the school had a formal team composed of members of school staff or composed of members of school staff and a partner organization; (ii) *Guidelines for implementation* was measured by: “Indicate your level of agreement: (The implementation team/the individuals who were responsible for planning the implementation) developed a written plan to facilitate implementation” with response choices ranging from strongly agree, agree, neither agree nor disagree, disagree, to strongly disagree. HPIs were coded as Yes if informants responded agree or strongly agree; (iii) *Training for implementation and delivery* was measured by: “Indicate your level of agreement. Prior to implementing (name of intervention), training was provided to animators” with response choices ranging from strongly agree, agree, neither agree nor disagree, disagree, to strongly disagree. HPIs were coded as Yes if informants responded agree or strongly agree; (iv) *Intervention leader* (i.e., program champion) was measured by: “Was there someone who advocated strongly for the

intervention and supported its implementation despite barriers?”. HPIs were coded as Yes if informants named one person as champion; (v) *Support from school principal* was measured by: “What was your role during the implementation of (name of intervention)?” followed by four choices including animator delivering the intervention to students, member of the implementation team, leader of the implementation team, and no direct role during the implementation. HPIs were coded as Yes if informants were the school principal (n=23) and they had identified themselves as member or leader of the implementation team; (vi) *Ability to solve problems during implementation* was measured by: “Indicate your level of agreement: (the implementation team/the individuals who were responsible for planning the implementation) solved critical implementation issues” with response choices ranging from strongly agree, agree, neither agree nor disagree, disagree, to strongly disagree. HPIs were coded as Yes if informants responded agree or strongly agree; (vii) *Adaptations to tailor HPI* was measured by: “Prior to implementation, did your school make any modifications to (name of intervention)?” (yes, no), and “Did (name of intervention) change during its implementation?” (yes, no). HPIs were coded Yes if informants had responded yes to at least one of the two questions; (viii) *Evaluation of implementation process* was measured by: “Did your school do any of the following to evaluate (name of intervention)? Document the extent to which implementation was carried out in accordance with the plan; Document the barriers and facilitators to implementation”. HPIs were coded Yes if informants had responded yes to at least one of the two questions; (ix) *Evaluation of program outcomes* was measured by: “Did your school do any of the following to evaluate (name of intervention)? Formally evaluate the outcomes of the (name of intervention)” (yes, no); (x) *Institutionalization* was measured by: “Is the intervention explicitly written in your school’s orientation plan (e.g., the educational project, the success plan or others)?” (yes, no).

Other characteristics of the specific HPI included *number of years offered* (range 1-10); *intervention developer* (de novo by the school, adopted from another organization); *perceived success* of the HPI measured in four items: (i) (HPI) met all objectives; (ii) abandoning (HPI) had/would have a negative effect on the students; (iii) (HPI) had a positive impact on students; and (iv) animators enjoyed working on (HPI). Responses ranging from 1 (strongly disagree) to 5 (strongly agree) were summed and divided by the number of items responded to, to create a mean score (Cronbach's alpha = 0.7); and *perceived permanence* measured by: "How permanent do you think the intervention is at your school?" Response options included very permanent, moderately permanent and not at all permanent and were dichotomized into very permanent and not at all or moderately permanent.

### ***C.3 Measures of health-promoting school culture***

School culture is defined as the way a school functions and the values, norms, beliefs and behaviours shared between staff, students and the school community (Domitrovich et al., 2008). In the second article of this thesis, I drew on the Health Promoting Schools theoretical framework (Langford et al., 2014) to conceptualize health-promoting school culture as characteristics of the school environment that facilitate implementation of health-promoting interventions. I developed four measures using items from the PromeSS questionnaire. The development of these measures is described in greater detail in the second article of this thesis.

*School/teacher commitment to student health* was a 4-item scale (Cronbach's alpha = 0.70) for which informants were asked "Indicate your level of agreement. (i) the amount of emphasis on

health promotion in your school's educational project is sufficient (n=170, range=2-5, mean=3.84, median=4.00, sd=0.96), (ii) teachers in your school are innovative, always seeking out new ways to facilitate students' progress (n=171, range=2-5, mean=4.06, median=4.00, sd=0.70), (iii) teachers in your school have a real interest in the health of the students (n=171, range=2-5, mean=4.34, median=4.00, sd=0.61), (iv) teachers in your school are committed to promoting healthy behaviours in their students (n=150, range=2-5, mean=4.26, median=4.00, sd=0.70).” Informants responded to each item using a 5-point Likert-type response scale ranging from 1 to 5 (response options included in order strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree). To create a mean score, responses were summed and divided by the number of items responded to, resulting in scores ranging from 0 to 5 with higher score representing higher levels of agreement.

*School physical environment* was a 7-item scale (Cronbach's alpha = 0.68) for which informants were asked “Indicate your level of agreement. In your school... (i) area provided for eating meals is pleasant and inviting (n=169, range=1-5, mean=3.46, median=4.00, sd=0.96), (ii) food distribution (including cafeteria, daycare, outside food suppliers, nutritional support programs) prioritizes foods of good nutritional value (n=148, range=1-5, mean=4.02, median=4.00, sd=0.83), (iii) measures are in place to foster active transportation (e.g. crossing guards, secure bike racks, etc.) (n=171, range=1-5, mean=3.39, median=4.00, sd=1.23), (iv) indoor facilities for physical education, extracurricular, and other physical activities meet the needs of all students (n=171, range=1-5, mean=3.82, median=4.00, sd=1.00), (v) outdoor facilities for physical education, extracurricular, and other physical activities meet the needs of all students (n=171, range=1-5, mean=3.71, median=4.00, sd=1.06), (vi) indoor school physical activity facilities are



available to all students outside the class timetable (n=171, range=1-5, mean=2.97, median=3.00, sd=1.25), (vii) outdoor school physical activity facilities are available to all students outside the class timetable (n=171, range=1-5, mean=4.03, median=4.00, sd=0.93). Informants responded to each item using a 5-point Likert-type response scale ranging from 1 to 5 (response options included in order strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree). To create a mean score, responses were summed and divided by the number of items responded to, resulting in scores ranging from 0 to 5 with higher score representing higher levels of agreement.

*Parent/community engagement with the school* was a 5-item scale (Cronbach's alpha = 0.7) for which informants were asked "Indicate your level of agreement. In your school... (i) meetings with teachers are well attended by parents (n=171, range=1-5, mean=4.23, median=4.00, sd=0.78), (ii) parents attend school-sponsored events (n=171, range=2-5, mean=4.01, median=4.00, sd=0.71), (iii) PPO (Parent Participation Organization) or Home & School meetings are well attended by parents (n=114, range=1-5, mean=3.43, median=4.00, sd=1.21), (iv) parent volunteers are easy to recruit (n=171, range=1-5, mean=3.47, median=4.00, sd=1.04), (v) community partners (e.g., community organizations, etc.) are involved in the planning and implementation of joint activities or interventions (n=171, range=1-5, mean=3.54, median=4.00, sd=0.95)." Informants responded to each item using a 5-point Likert-type response scale ranging from 1 to 5 (response options included in order strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree). To create a mean score, responses were summed and divided by the number of items responded to, resulting in scores ranging from 1 to 5 with higher score representing higher levels of agreement.

*Ease for principal leadership* was a 7-item scale (Cronbach's alpha = 0.77). School informants were asked "In this school, how difficult is it for the principal to (i) demonstrate leadership for change (n=146, range=2-5, mean=3.90, median=4.00, sd=0.83), (ii) establish a climate of openness to innovation (n=146, range=1-5, mean=3.86, median=4.00, sd=0.88), (iii) ensure that instructional goals are clearly communicated to everyone (n=146, range=2-5, mean=3.89, median=4.00, sd=0.69), (iv) secure resources for health-promoting interventions (n=146, range=1-5, mean=4.47, median=4.00, sd=0.83), (v) foster respect (n=146, range=3-5, mean=4.21, median=4.00, sd=0.60), (vi) establish a safe and orderly school environment (n=146, range=2-5, mean=3.86, median=4.00, sd=0.75), (vii) guide the staff in the process of solving problems (n=146, range=1-5, mean=3.71, median=4.00, sd=0.82)?" Informants responded to each item using a 5-point Likert-type response scale ranging from 1 to 5 (response options included in order very difficult, difficult, neither easy nor difficult, easy, and very easy). To create a mean score, responses were summed and divided by the number of items responded to, resulting in scores that could range from 1 to 5, with higher score representing less difficulty.

#### ***C.4 Informant characteristics***

Variables collected on school informant characteristics included *gender* (male; female), *age* (<30; 30-39; 40-49; 50-59; > 60), *current position in the school* (principal; vice-principal; homeroom teacher; physical education teacher), *highest level of completed education* (bachelor's degree; graduate diploma or certificate; master's; PhD), *number of years of experience in current school* (less than 1; 1-3; 4-6; 7-9; 10 or more), and *number of years of experience in current position* (less than 1; 1-3; 4-6; 7-9; 10 or more).

All study variables for this thesis are also described in Appendix E including questionnaire item(s), response options, coding for analysis, and Cronbach's alpha for scales.

**Appendix D. Questionnaire items, response choices and coding for analysis for all study variables**

<b>Variable (Cronbach's alpha (if applicable))</b>	<b>PromeSS Questionnaire item(s)</b>	<b>Response choices</b>	<b>Responses recoded for analysis</b>
<b>Informant characteristics</b>			
Current position in the school	The participant is...	School principal; School vice-principal; Homeroom teacher; Physical Education Teacher; Other	School principal; vice-principal; teacher
Number of years of experience in current school	How many years have you been working in your school as a...	Less than 1; 1-3; 4-6; 7-9; $\geq 10$	As is
<b>School characteristics</b>			
Language of instruction	Data obtained from the Ministère de l'Éducation et de l'Enseignement Supérieur du Québec (MEES)	French; English	As is
Number of students in the school	How many students were registered in your school on September 30 of this school year in kindergarten/1 <sup>st</sup> /2 <sup>nd</sup> /3 <sup>rd</sup> /4 <sup>th</sup> /5 <sup>th</sup> /6 <sup>th</sup> grade?	As is	Total sum split in tertiles: 30-149; 150-349; 350-889
Student/teacher ratio	How many of the following staff members work in your school?	Teachers (full-time)	Divided total number of students in the school by total number of teachers
Proportion of students absent per day	On average, how many students in your school are absent each day? (Does not include late arrivals or early departures).	As is (number)	Divided by total number of students in the school
Proportion of students considered at-risk	How many students in your school are considered at risk or EHDA (élèves handicapés ou en difficultés d'adaptation ou d'apprentissage)?	As is (number)	As is
Teacher turnover	Indicate your level of agreement. In the past 3 years your school experienced teacher turnover.	Several staff; Some staff; Few staff; No turnover in the past 3 years; No turnover in more than 3 years	Low (Few staff; No turnover in the past 3 years; No turnover in

			more than 3 years); High (Several staff; Some staff)
Principal turnover	Indicate your level of agreement. In the past 3 years your school experienced principal turnover.	3 in 3 years; 2 in 3 years; 1 in 3 years; in 3 years; 0 in more than 3 years	Low (1 in 3 years; in 3 years; 0 in more than 3 years); High (3 in 3 years; 2 in 3 years)
Total number of other HPIs offered in the school			
Socioeconomic status of the student body	Socioeconomic indicator (IMSE) obtained from the Ministère de l'Éducation et de l'Enseignement Supérieur du Québec (MEES)	1 (most advantaged) to 10 (least advantaged)	Advantaged (IMSE indicator between 1-3); Moderately advantaged (IMSE indicator between 4-7); Disadvantaged (IMSE indicator between 8-10).
Perceived importance of mental health issues at school	In the past year, how important was each of the following health issues for your Grade 5 and 6 students? Problems with mental health (e.g. anxiety)	Extremely important; very important; important; not very important; not at all important	Important (Extremely important, very important, important); Not important (not very important, not at all important)
<b>School culture variables</b>			
Parent/community engagement in school ( $\alpha=0.7$ )	Indicate your level of agreement. In your school... (i) meetings with teachers are well attended by parents, (ii) parents attend school-sponsored events, (iii) PPO (Parent Participation Organization) or Home & School meetings are well attended by parents, (iv) parent volunteers are easy to recruit, (v) community partners (e.g., community organizations, etc.) are involved in the	1.Strongly disagree; 2. Disagree; 3. Neither agree or disagree; 4. Agree; 5. Strongly agree	Responses were summed and divided by the number of items responded to, to create a mean score

	planning and implementation of joint activities or interventions.		
School physical environment ( $\alpha=0.6$ )	Indicate your level of agreement. In your school... (i) area provided for eating meals is pleasant and inviting, (ii) food distribution (including cafeteria, daycare, outside food suppliers, nutritional support programs) prioritizes foods of good nutritional value, (iii) measures are in place to foster active transportation (e.g. crossing guards, secure bike racks, etc.), (iv) physical activity is provided on all days when there is no physical education class to all students (not including activities during lunch, recess or before/after school), (v) indoor facilities for physical education, extracurricular, and other physical activities meet the needs of all students, (vi) outdoor facilities for physical education, extracurricular, and other physical activities meet the needs of all students, (vii) indoor school physical activity facilities are available to all students outside the class timetable, (viii) outdoor school physical activity facilities are available to all students outside the class timetable, (ix) access to indoor and outdoor facilities for physical education, extracurricular and other physical activities belonging to other schools or community/private organizations is available to all students (does not include municipal parks).	1.Strongly disagree; 2. Disagree; 3. Neither agree or disagree; 4. Agree; 5. Strongly agree	Responses were summed and divided by the number of items responded to, to create a mean score
School/teacher commitment to student health	Indicate your level of agreement. (i) the amount of emphasis on health promotion in your school's educational project is sufficient,	1.Strongly disagree; 2. Disagree; 3. Neither agree or disagree; 4. Agree; 5. Strongly agree	Responses were summed and divided by the number of items

( $\alpha=0.7$ )	(ii) teachers in your school are innovative, always seeking out new ways to facilitate students' progress, (iii) teachers in your school have a real interest in the health of the students, (iv) teachers in your school are committed to promoting healthy behaviours in their students.		responded to, to create a mean score
Ease of principal leadership ( $\alpha=0.8$ )	Indicate the level of difficulty. In this school how difficult is it for the principal to... (i) demonstrate leadership for change, (ii) establish a climate of openness to innovation, (iii) ensure that instructional goals are clearly communicated to everyone, (iv) securing resources for health-promoting interventions, (v) foster respect, (vi) establish a safe and orderly school environment, (vii) guide the staff in the process of solving problems.	1. Strongly disagree; 2. Disagree; 3. Neither agree or disagree; 4. Agree; 5. Strongly agree	Responses were summed and divided by the number of items responded to, to create a mean score
<b>Mental health HPI availability</b>			
Availability of mental health HPIs	In the past year, has your school offered any mental health HPIs in which participation is expected at the group, class, grade, or school-level to address mental health and well-being?	Yes; No As is (number)	As is
<b>Specific HPI in-depth variables</b>			
Health topics the HPI was designed to address	What aspect(s) of your students' health and wellbeing does (name of intervention) primarily address? 1) smoking prevention; 2) tobacco control education; 3) aggressive behaviour; 4) mental health (e.g. anxiety); 5) bullying (may include cyberbullying); 6) physical activity; 7) healthy eating; 8) addiction prevention (e.g. alcohol, drugs, gambling); 9) personal hygiene; 10) puberty; 11) personal safety and injury prevention; 12) oral health; or other	No; Yes (for each)	As is

<p>Number of years offered</p>	<p>Is (name of intervention) currently being offered at your school?</p> <p>If not, what year was (name of intervention) last offered to students?</p> <p>If yes, how long has (name of intervention) been offered in your school?</p>	<p>Yes/No</p> <p>1. 2016-17; 2. 2015-16; 3. 2014-15; 4. 2013-14; 5. 2017-18</p> <p>As is (years)</p>	<p>Number of years HPI available at the school;</p> <p>Number of years since HPI was first offered</p> <p>As is (years)</p>
<p>Intervention developer</p>	<p>Who originally designed (name of intervention)?</p>	<p>School principal; Vice principal; Homeroom teacher(s) in your school; Other teacher(s) in your school; Professional staff member(s) in your school; Internal group; Schoolboard (educational services, student services); University-based researcher or research team; Provincial Ministry; CISSS/CIUSSS (Centre intégré de santé et de services sociaux/Centre intégré universitaire de santé et de services sociaux); Community organization; Not-for-profit organization; For-profit organization; Other</p>	<p>Developer (School principal; Vice principal; Homeroom teacher(s) in your school; Other teacher(s) in your school; Professional staff member(s) in your school; Internal group; Other)</p> <p>Adopter (Schoolboard (educational services, student services); University-based researcher or research team; Provincial Ministry; CISSS/CIUSSS (Centre intégré de santé et de services sociaux/Centre intégré universitaire de santé et de services sociaux); Community organization; Not-for-profit organization; For-profit organization; Other)</p>



Sequenced step-by-step program	(Name of intervention) was a... 1) special event (e.g. health fair, guest speaker at an assembly, etc.) (specify); 2) pedagogical activity; 3) learning and evaluation situation; 4) program (specify); 5) other (specify)	No; Yes (for each)	Yes (program); No (special event, pedagogical activity, learning and evaluation situation, other)
Active forms of learning	What type of learning strategy was used for (name of intervention)? Check all that apply. 1) Lecture strategies: presentations, demonstrations; 2) Individual work: independent practice; 3) Interactive teaching strategies: group discussion, role-play, modeling; 4) Social constructivist teaching strategies: peer education, tutoring, collaborative and cooperative learning; 5) Other (specify).	No; Yes (for each)	Active (interactive, social constructivist); Inactive (lecture, individual)
Skill development	Were any of the following core competencies incorporated into (name of intervention)? Check all that apply. 1) self-esteem; 2) managing emotions and stress; 3) positive interactions with others; 4) self-awareness; 5) learning to say 'no'; 6) asking for help; 7) informed lifestyle choices; 8) adoption of prosocial choices; 9) management of prosocial choices; 10) social engagement; 11) other (specify).	No; Yes (for each)	As is
Whole school approach (targeting all grades)	Which grade(s) received (name of intervention)?	No; Yes (for each grade)	Yes (all grades received intervention); No
Whole school approach (changes to school culture and environment)	Were there any other initiatives occurring in your school before or around the same time as (name of intervention) that addressed the same health and wellbeing issue as (name of intervention)? Check all that apply. 1) media campaign, 2) assemblies, 3) extra-curricular	No; Yes (for each)	Yes (at least one); No (none)

	activities, 4) linking to services offered by external organization, 5) infrastructure, 6) social environment, 7) school policy, 8) school day care service activities, 9) special events.		
Family involvement	Were the following members of the school community included in (name of intervention): Families (invited to participate).	No; Yes	As is
Delivery by in-school animators	(Name of intervention) animators were... Check all that apply.	Homeroom teachers; Other teachers; Student-peers; School health professionals (e.g. nurse, dental hygienist, etc.); External health professionals (e.g. physician); Members of a community organization; CEGEP or university students; Other (specify)	Internal to the school (Homeroom teachers; Other teachers; Student-peers; School health professionals); External to the school (External health professionals (e.g. physician); Members of a community organization; CEGEP or university students)
Coordination team for implementation	Who was responsible for planning how (name of intervention) would be implemented in the first year?	A team composed of members of the school staff; A team composed of members of the school staff and a partner organization; School principal; Vice principal; Homeroom teacher; Other teacher; External agency; (Name of intervention) developers; Other (specify)	Yes (team); No
Guidelines for implementation	Indicate your level of agreement: (The implementation team/the individuals who were responsible for planning the implementation) developed a written plan to facilitate implementation.	1.Strongly disagree; 2. Disagree; 3. Neither agree or disagree; 4. Agree; 5. Strongly agree	Yes (Agree; Strongly agree); No (Strongly disagree; Disagree; Neither agree or disagree)

Training for implementation and delivery	Indicate your level of agreement. Prior to implementing (name of intervention), training was provided to animators.	1.Strongly disagree; 2. Disagree; 3. Neither agree or disagree; 4. Agree; 5. Strongly agree	Yes (Agree; Strongly agree); No (Strongly disagree; Disagree; Neither agree or disagree)
Intervention leader	Was there someone who advocated strongly for the intervention and supported its implementation despite barriers?	No; Yes	As is
Support from school principal	What was your role during the implementation of (name of intervention)? Indicate all that apply.	Animator delivering the intervention to students; member of the implementation team; leader of the implementation team; no direct role during the implementation.	Yes (member of the implementation team; leader of the implementation team); No
Ability to solve problems during implementation	Indicate your level of agreement: (the implementation team/the individuals who were responsible for planning the implementation) solved critical implementation issues.	1.Strongly disagree; 2. Disagree; 3. Neither agree or disagree; 4. Agree; 5. Strongly agree	Yes (Agree; Strongly agree); No (Strongly disagree; Disagree; Neither agree or disagree)
Adaptations to tailor HPI	<p>Prior to implementation, did your school make any modifications to (name of intervention)?</p> <p>Did (name of intervention) change during its implementation? (Name of intervention)...</p>	<p>1) No modifications were made: it could be used as is; 2) No modifications were made: it was already tailored to our school; 3) No modifications were made: other reason; 4) Yes, minor modifications; 5) Yes, major modifications; 6) Yes, but don't know if they were major or minor modifications; 7) Don't know.</p> <p>An external agency implemented the intervention in our school.</p> <p>1)Did not change at all ;2) Underwent minor modifications ;3)</p>	<p>1-3, 7 = No 4-6 = Yes</p> <p>1, 5=no 2-4=yes</p>

		Underwent major modifications ;4) Changed completely ;5) Don't know. An external agency implemented the intervention in our school	
Evaluation of implementation process	Did your school do any of the following to evaluate (name of intervention)? Document the extent to which implementation was carried out in accordance with the plan; Document the barriers and facilitators to implementation.	No; Yes	As is
Evaluation of program outcomes	Did your school do any of the following to evaluate (name of intervention)? Formally evaluate the outcomes of the (name of intervention).	No; Yes	As is
Institutionalization	Is the intervention explicitly written in your school's orientation plan (e.g., the educational project, the success plan or others)?	No; Yes	As is
Perceived success	Indicate your level of agreement. In this school... (i) (intervention) met all objectives; (ii) abandoning (intervention) had/would have a negative effect on the students; (iii) (intervention) had a positive impact on students; and (iv) animators enjoyed working on (intervention).	1.Strongly disagree; 2. Disagree; 3. Neither agree or disagree; 4. Agree; 5. Strongly agree	Responses were summed and divided by the number of items responded to, to create a mean score for perceived HPI success.
Perceived permanence	How permanent do you think the intervention is at your school?	Very permanent; moderately permanent; not at all permanent	Very permanent/Moderately permanent; Not at all permanent

## **Appendix E. Detailed description of statistical analyses**

### ***E.1 Article 1 – Social inequalities in availability of health-promoting interventions in Québec elementary schools***

In this article, the objectives were to describe social inequalities in elementary schools in: (i) level of importance that school principals attribute to 13 common health-related issues among students in their school; (ii) availability of HPAs within their school addressing eight health topics; and (iii) (mis)alignment between perceived importance and HPA availability.

We first inspected the variables in our database and checked for missing values to assess whether imputation was needed. We checked for incorrect or inadmissible codes and recoded variables for clarity where necessary. We examined the distribution and assumptions of normality for each variable and computed descriptive statistics (e.g., mean, standard deviation, median, interquartile range). To begin investigating the relationships between the variables of interest, we computed cross-tabulations of perceived importance of health issues by school deprivation and availability of HPAs by school deprivation. To quantify the differences across school deprivation levels, we then estimated unadjusted relative risks and their 95% confidence intervals for perceived importance of health issues and for HPA availability across school deprivation level in Poisson regression models (Zou, 2004). (Mis)alignment between perceived importance and HPA availability for eight health issues was portrayed in bar charts. Analyses were performed using SPSS, Version 25.0 (Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.).

## *E.2 Article 2 – Social inequalities and measurement of a school culture that facilitates health-promoting interventions in elementary schools*

In this article, the objective was to examine whether dimensions of health-promoting school culture were associated with socioeconomic deprivation of the school neighborhood. To do so, two studies were conducted with the following specific objectives: (1) to develop a theoretically informed and reliable measure of health-promoting school culture drawing on the HPS theoretical framework; and (2) to investigate whether scores for dimensions of health-promoting school culture differed between schools according to neighborhood social and material deprivation.

First, we developed measures of a health-promoting school culture using items from the PromeSS questionnaire. We selected 18 items that aligned with at least one of the concepts in the HPS theoretical framework. We inspected each variable and checked for missing values that would require imputation. We assessed kurtosis and skewness for normality. We conducted exploratory factor analysis (EFA) estimated by maximum-likelihood extraction with Oblimin rotation, to test multidimensionality (i.e., that among the total list, items that are strongly-correlated together but weakly correlated with other items group into separate factors) (ref). We used a three-factor model to examine whether items loaded onto the expected three dimensions inspired by the HPS framework (i.e. social environment, physical environment, connection with parents/community). Items retained were summed and divided by the number of items to create a mean score for each dimension, and labeled “school/teacher commitment to student health”, “school physical environment”, and “parent/community engagement in the school”. Cronbach’s alpha was computed to assess internal consistency of each resulting scale, with  $\alpha > 0.6$  considered acceptable (Hair et al 2010).

Second, to investigate whether the scores for each dimension of health-promoting school culture differed by school deprivation, we used one-way ANOVA with post-hoc Tukey-Kramer analyses to compare means across schools by neighborhood social and material deprivation separately. Analyses were performed using SPSS, Version 27.0 (Released 2020. IBM SPSS Statistics for Macintosh, Version 27.0. Armonk, NY: IBM Corp.).

### ***E.3 Article 3 – School context correlates of availability of mental health promotion interventions in elementary schools***

In this article, the objectives were to (i) identify factors in the school context that are associated with the availability of mental health HPIs in elementary schools in Québec, Canada; and (ii) to assess whether mental health HPIs implemented in study schools adhere to established best practices.

For the first objective, we inspected all variables identified as potential correlates of availability of mental health HPIs and checked for missing values. We examined the distribution and assumptions of normality for each variable and computed descriptive statistics (e.g., mean, standard deviation, median, interquartile range). For each potential correlate, we calculated the proportion of schools where mental health HPIs were available and computed chi-square tests. We then quantified the association between the potential correlates and the outcome by estimating separate unadjusted logistic regression models (i.e., one model for each correlate). We did not test an omnibus model and avoided issues of multiple testing by investigating each potential correlate independently in a logistic regression model as a single hypothesis so that only one univariate

statistical test was performed for each potential correlate. We calculated robust standard errors to account for possible data clustering within the school boards from which PromeSS schools were recruited. Given the lack of knowledge on which variables could be predictors of both the potential correlates and the outcome and the fact that lack of understanding of causal pathways could lead to misclassification of mediators as confounding variables, we did not adjust for confounding variables. Sensitivity analyses were conducted in which we adjusted for socioeconomic status of the student body, language of instruction, and number of students for all potential correlates, but we refer to the unadjusted models especially given that results remained similar.

For the second objective, we first examined the HPI that had been selected by informants for in-depth questioning and selected those that had been described as addressing mental health, bullying, substance use, or “other”. We reviewed the written descriptions and excluded HPIs that were not directly focused on mental health and well-being. We computed descriptive statistics to characterize the remaining 26 mental health HPIs. Analyses were performed using SPSS, Version 27.0 (Released 2020. IBM SPSS Statistics for Macintosh, Version 27.0. Armonk, NY: IBM Corp.).



## Appendix F. Ethics Approval

### F.1 CRCHUM Certificate



#### COMITÉ D'ÉTHIQUE DE LA RECHERCHE DU CHUM

*Édifice Cooper  
3981, boulevard St-Laurent, Mezz 2  
Montréal (Québec) H2W 1Y5*

Le 21 janvier 2013

Dre Jennifer O'Loughlin, Ph.D.  
CRCHUM  
[jennifer.oloughlin@umontreal.ca](mailto:jennifer.oloughlin@umontreal.ca)

A/s Mme Érika Dugas  
CRCHUM  
Édifice Saint-Urbain – RC  
Montréal (Québec) H2W 1V1  
[erika.dugas@crchum.qc.ca](mailto:erika.dugas@crchum.qc.ca)

**Objet :** 12.307 – Approbation initiale et finale CÉR – Approbation de principe

Consolider les liens entre la recherche, la pratique et les politiques publiques pour réduire le fardeau du tabagisme chez les jeunes

Docteure O'Loughlin,

J'ai pris connaissance des documents suivants reçus au CÉR du CHUM en date du 20 décembre 2012 en vue de l'approbation de principe du projet en rubrique :

- Lettre de présentation datée du 12 décembre 2012
- Formulaire de demande d'évaluation éthique d'un projet de recherche
- Formulaire A
- Courriel de Mme Lori Moser à Mme Érika Dugas daté du 12 décembre 2012 concernant la « Notification of Award Team Grant »
- Notification of Ward Team Grant – Société canadienne du cancer – 01 novembre 2012
- Review Panel Report – Version 12/05/2012 – Société canadienne du cancer
- Budgets – CSS PITG-12 – Core and Individual Projects
- Consentements – Étude NICO – Régie régionale de la santé et des services sociaux de Montréal-Centre
- Consentement – Étude AdoQuest
- Team Grant Configuration and Overview Application
- Protocole – Politiques et règles de fonctionnement de la banque de données
- Appendix 1 – Selected Publications

En vertu des pouvoirs qui me sont délégués par le Comité d'éthique de la recherche du CHUM pour procéder à une évaluation accélérée, il me fait plaisir de vous informer que j'approuve le programme de recherche tel que soumis. Cette approbation a pour but de permettre le dépôt de votre récente subvention de la Société du Cancer, dans vos fonds de recherche au CRCHUM.

#### CENTRE HOSPITALIER DE L'UNIVERSITÉ DE MONTRÉAL

HÔTEL-DIEU (siège social)  
3840, rue Saint-Urbain  
Montréal (Québec)  
H2W 1T8

HÔPITAL NOTRE-DAME  
1560, rue Sherbrooke Est  
Montréal (Québec)  
H2L 4M1

HÔPITAL SAINT-LUC  
1058, rue Saint-Denis  
Montréal (Québec)  
H2X 3J4



Il est entendu que chacun des volets de votre programme de recherche qui n'a pas déjà obtenu une approbation devra être présenté au CÉR, comme projet de recherche distinct du programme, avant que vous puissiez débiter le recrutement de participants.

La présente constitue l'approbation finale du comité suite à une procédure d'évaluation accélérée. Elle est valide pour un an à compter du 21 janvier 2013, date de l'approbation de votre projet.

Le comité suit les règles de constitution et de fonctionnement de l'Énoncé de Politique des trois Conseils et des Bonnes pratiques cliniques de la CIH.

Vous souhaitant la meilleure des chances dans la poursuite de vos travaux, je vous prie d'accepter, Docteur O'Loughlin, mes salutations distinguées.

Brigitte St-Pierre, conseillère en éthique  
Présidente  
Comité d'éthique de la recherche du CHUM

*BSP/go*

C.C. – Bureau des contrats

**Voici les coordonnées de la personne ressources pour ce projet**

Mme Ghislaine Otis  
Téléphone : 514 890-8000, poste 14485  
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## F.2 Université de Montréal Certificate



Comité d'éthique de la recherche en sciences et en santé (CERSES)

16 avril 2021

**Objet: Reconnaissance d'une approbation éthique** – « Social inequalities in health promotion programming in Québec elementary schools: the contribution of school culture »

Mme Jodi Kalubi,

Le Comité d'éthique de la recherche en sciences et en santé (CERSES) reconnaît l'approbation éthique 12.307 du Comité d'éthique de la recherche du CHUM. Vous trouverez ci-joint une copie numérisée de votre certificat.

Notez qu'il y apparaît une mention relative à un suivi annuel et que le certificat comporte une date de fin de validité. En effet, afin de répondre aux exigences éthiques en vigueur au Canada et à l'Université de Montréal, nous devons exercer un suivi annuel auprès des chercheurs et étudiants-chercheurs. **Dans le but de vous conformer à cette exigence, veuillez avoir l'obligeance de nous faire suivre le suivi annuel lorsqu'approuvé par le Comité d'éthique de la recherche du CHUM.**

Il est entendu que cela ne modifie en rien l'obligation pour le chercheur, tel qu'indiqué sur le certificat d'éthique, de signaler au CERSES tout incident grave dès qu'il survient ou de lui faire part de tout changement anticipé au protocole de recherche.

Nous vous prions d'agréer, Mesdames, l'expression de nos sentiments les meilleurs,

*Christine Grou*, présidente

Comité d'éthique de la recherche en sciences et en santé (CERSES)  
Université de Montréal

c.c. Gestion des certificats, BRDV

Jennifer O'Loughlin, professeure titulaire, ESPUM - Département de médecine sociale et préventive

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Comité d'éthique de la recherche en sciences et en santé (CERSES)

CERTIFICAT D'APPROBATION ÉTHIQUE

Le Comité d'éthique de la recherche en sciences et en santé (CERSES) reconnaît l'approbation éthique datée du 21 janvier 2013 du Comité d'éthique de la recherche du CHUM.

Projet	
<b>Titre du projet</b>	<b>Social inequalities in health promotion programming in Québec elementary schools: the contribution of school culture</b>
<b>Étudiante requérante</b>	Jodi Kalubi, candidate au doctorat, ESPUM - Département de médecine sociale et préventive
<b>Sous la direction de:</b>	Jennifer O'Loughlin, professeure titulaire, ESPUM - Département de médecine sociale et préventive, Université de Montréal & Louise Potvin, professeure titulaire, ESPUM - Département de médecine sociale et préventive, Université de Montréal.
<b>Coordination du projet:</b>	Teodora Riglea

Financement	
<b>Organisme</b>	Ministère de la santé et des services sociaux
<b>Programme</b>	
<b>Titre de l'octroi si différent</b>	Recherche portant sur les disparités en matière de statut socio-économique (SSE) dans les programmes de prévention du tabagisme en milieu scolaire
<b>Numéro d'octroi</b>	
<b>Chercheur principal</b>	Jennifer O'Loughlin
<b>No de compte</b>	

Approbation reconnue	
<b>Approbation émise par</b>	Comité d'éthique de la recherche du CHUM.
<b>Certificat:</b>	12.307

MODALITÉS D'APPLICATION

Tout changement anticipé au protocole de recherche doit être communiqué au Comité qui en évaluera l'impact au chapitre de l'éthique. Toute interruption prématurée du projet ou tout incident grave doit être immédiatement signalé au Comité.

Christine Grou, présidente  
Comité d'éthique de la recherche en sciences  
et en santé (CERSES)  
Université de Montréal

**16 avril 2021**  
Date de délivrance

**21 janvier 2022**  
Date de fin de validité

**21 janvier 2022**  
Date du prochain suivi

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## **Appendix G. Additional publication: Correlates of perceived success of health-promoting interventions in elementary schools.**

Published in *Health Promotion and Chronic Disease Prevention in Canada* in 2022

### **AUTHORS**

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**AUTHORS’ CONTRIBUTIONS.** All authors contributed to conceptualization of the study objectives and analytic plan, interpreted the results and reviewed and revised the manuscript. EOL conducted the analyses, reviewed the literature and drafted the manuscript. JK developed the school culture variables, wrote the discussion and reviewed the manuscript. AP conducted analyses and reviewed the manuscript. TR contributed to analysis of the results and reviewed the manuscript. JOL developed and oversaw all aspects of Project PromeSS including its conceptualization, funding, design and data collection. All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

**FUNDING.** JOL held a Canada Research Chair in the Early Determinants of Adult Chronic Disease from 2006 to 21. JK holds a doctoral scholarship from the Quebec Order of Nurses (Ordre des infirmières et infirmiers du Québec). EOL holds a post-doctoral salary award from the Fonds de recherche du Québec—Santé (FRQ-S). Funding sources were not involved in the study design, data collection, analysis or interpretation, or the preparation of the manuscript for publication.

**WORD COUNT** = 5,187 including Abstract, Text, and References

**NUMBER OF TABLES** = 3

**NUMBER OF FIGURES** = 0

**NUMBER OF SUPPLEMENTARY TABLES AND FIGURES** = 0

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## **ABSTRACT**

**Introduction:** School-based health-promoting interventions (HPIs) aim to support youth development and positively influence modifiable lifestyle behaviours. The objective of this study was to identify factors that contribute to or hinder the perceived success of HPIs could facilitate their adaptation, improve implementation, and contribute to HPI sustainability.

**Objectives:** To identify factors in three domains (i.e., school characteristics, characteristics of the HPI, and factors related to planning and implementing the HPI) associated with perceived success of HPIs among school principals in elementary schools.

**Methods:** Data were drawn from Project PromeSS, a cross-sectional survey of school principals and/or nominated staff members in a convenience sample of 171 public elementary schools in Quebec, Canada. School board and school recruitment spanned three academic school years (2016-2019). Data on school and participant characteristics, HPI characteristics, variables related to HPI planning and implementation, and perceived success of the HPI were collected in two-part structured telephone interviews. Descriptive statistics were used to characterize schools retained and study participants. Twenty-eight potential correlates of perceived HPI success were each investigated separately in multivariable linear regression modelling.

**Results:** Participants generally perceived HPIs as highly successful. After controlling for number of students, language of instruction, school neighbourhood and school deprivation, we identified five correlates of perceived success including lower teacher turnover, higher scores for school physical environment, school/teacher commitment to student health, principal leadership, and school being a developer (vs adopter) of the HPI.

**Conclusion:** If replicated, these factors should be considered by HPI developers and school personnel when planning and implementing HPIs in elementary schools.

**Keywords:** health-promoting schools, interventions, cross-sectional study, perceived success

## **HIGHLIGHTS**

- Participants generally perceived health-promoting interventions (HPIs) as highly successful.
- Four of 11 school characteristics were associated with perceived success of the HPI including lower teacher turnover, school physical environment, school/teacher commitment to student health and principal leadership.
- None of the eight characteristics of the HPI was associated with perceived success.
- Of the nine factors related to HPI planning or implementation, only being a developer (vs. an adopter) of the HPI was associated with perceived success.

## INTRODUCTION

School-based health-promoting interventions (HPIs) support the development of positive physical, emotional and mental health among youth, including the acquisition of healthy lifestyle behaviours.<sup>1,2</sup> Common HPI theme areas include physical activity (which generally declines from childhood into adolescence and young adulthood<sup>3,4</sup>), healthy nutrition (e.g. attaining adequate levels of consumption of vegetables, fruits and whole grains), substance use behaviours (including use of alcohol, tobacco and cannabis, which can emerge early and escalate during adolescence)<sup>5</sup> and awareness related to aggressive behaviour (including verbal, physical and cyber-bullying). School-based HPIs are important components of broader public health strategies that aim to foster health-promoting behaviours in children from an early age.<sup>6</sup> Because children spend many hours each day at school, elementary schools are ideal settings for HPIs because they have high potential for reaching all children, regardless of socioeconomic status.<sup>7</sup>

Numerous HPIs are deemed centrally important for child development and are therefore government-mandated. In Québec, Canada, these comprise HPIs that aim to improve awareness, knowledge and attitudes, and promote healthy behaviours related to physical activity, tobacco use, dental health, sex education and bullying.<sup>8-11</sup> In addition to government-mandated HPIs, many schools choose to implement other HPIs, depending on perceived need within the school community. These school-specific HPIs may be adopted by the school from an external organization or developed *de novo* by the school.

Despite its importance, evaluation of the impact of school-based HPIs can pose major challenges in assessing benefits. Many school-based HPIs are not evaluated<sup>12,13</sup> and among those that are evaluated, results on effectiveness, implementation success and sustainability are often mixed.<sup>14</sup>



For example, two reviews<sup>12,15</sup> suggested small to modest effects of tobacco prevention programs, although evidence on long-term effects is limited and most studies are of relatively poor quality.<sup>12</sup> Methodological challenges include ethical and feasibility issues in implementing randomized controlled trials (RCTs) in a school context<sup>12,16-18</sup> and lack of consensus on how to conduct process evaluations of school-based interventions. Evaluations of school-based HPIs often assess one specific intervention within one school, or a specific single theme (e.g. a physical activity) that has been broadly implemented in many schools, which can make generalization to other theme areas or settings challenging.

In addition, obtaining objective data to measure the success of an intervention (i.e. expired carbon monoxide for tobacco control programs; pedometer data for physical activity interventions)<sup>19</sup> can be challenging and expensive. Perceptions of success, especially among decision makers within the school, may be equally if not more important measures of success, since perceived success may be a key driver in the decision to sustain an HPI within the school.<sup>20</sup>

Key features of successful HPIs identified to date include noncurricular approaches, playground interventions, after-school sessions and daily classroom refreshers.<sup>12</sup> In general, community-level interventions including those that are school-based should incorporate knowledge, beliefs and attitudes training while promoting healthy behaviour, since these features are related to intervention success regardless of theme area.<sup>12,21</sup> Further, emerging implementation science literature indicates that factors related to both the school (e.g. organizational context, leadership) and the intervention (e.g. partnerships, planning and implementation processes) are associated with implementation fidelity and effectiveness of HPIs.<sup>22,23</sup> Finally, school principals are key players in the school environment and instrumental in HPI implementation and sustainability.<sup>24</sup> Because

they are knowledgeable about their school, the interventions offered and school staff opinions, their perception of HPI effectiveness is a key indicator of the potential usefulness of HPIs.

An increased understanding of what contributes to successful HPIs regardless of theme or setting could help school boards, school staff and the community increase autonomy in developing, selecting, implementing and evaluating interventions that align with school-specific needs. Further, identifying modifiable and nonmodifiable factors that contribute to or hinder the perceived success of HPIs could facilitate adaptations, improve implementation and contribute to the sustainability of school-based HPIs. Overall, offering schools evidence-informed interventions could increase the potential for HPI effectiveness and remove some of the guess work from choosing an appropriate HPI.

Our objective in this study was to identify factors in three domains associated with perceived success of HPIs among elementary school principals. The three domains were school characteristics, characteristics of the HPI and factors related to planning and implementing HPIs. This project was undertaken as part of Project PromeSS, a cross-sectional survey of school principals and/or nominated staff members in a convenience sample of public elementary and high schools in Quebec.

### **Conceptual model**

Delivery of school-based HPIs in Project PromeSS was envisioned based on a conceptual model guided by Rogers' Diffusion of Innovations Theory,<sup>25,26</sup> which explains how and why innovations (e.g. new HPIs) are adopted by schools. Specifically, the decision process is influenced by the characteristics of the innovation, the individuals involved and the organization implementing the

innovations.<sup>26</sup> The process described by Rogers comprises four phases: planning, implementation, sustainability and scale-up. The PromeSS conceptual model<sup>27</sup> depicts these four phases in the context of school-based HPI delivery while illustrating environmental influences at the school, neighbourhood and social levels. During planning, the school matches its needs with an existing intervention or develops an intervention *de novo*. During implementation, the intervention is delivered to students and may be modified. If an intervention is deemed unsuccessful, it can be terminated at any point. Interventions deemed successful may be renewed, become embedded in the school (i.e. sustained) or scaled up.<sup>27</sup> In this study, this model guided the selection of potential correlates of HPI perceived success.

## **METHODS**

Data were drawn from Project PromeSS. The sampling frame comprised all 1795 elementary and 436 high schools in 69 school boards across Quebec in 2016. Our analytical sample was restricted to elementary schools, since high schools differ markedly in student population, health issues perceived as important by school principals, and relevant HPI content and delivery methods. School board approval was obtained in 32 of 69 eligible school boards (46%), and 594 elementary schools (i.e. 33% of all elementary schools in Quebec) within the 32 school boards were eligible for recruitment. Private schools, schools serving only students with intellectual impairments or learning difficulties, and schools with fewer than 30 students were excluded because they are not assigned a school deprivation indicator. Contact was established with 291 of the 594 eligible elementary schools (49%); 171 of 291 eligible schools (59%) provided verbal assent and completed the interview.

Detailed data collection procedures are described elsewhere.<sup>26</sup> Briefly, schools were mailed or emailed a letter of introduction advising them of an upcoming telephone contact by the team. One week later, principals were contacted to confirm that they had worked in their current school longer than six months, and to solicit participation. If unavailable, the school principal nominated a vice principal (n = 7) or another staff member (n = 5) to complete the interview.

Data were collected from 2016 to 2019 in two-part structured telephone interviews (median length 52.0 minutes) administered by trained interviewers in English or French. Participants provided data on school characteristics (i.e. school neighbourhood, funding from external sources, student demographics, perceived importance of specific student health issues), participant characteristics (i.e. sex, age, position, years working in the school) and availability of HPis and extracurricular activities.

HPis were defined as activities complementary to the educational curriculum offered to all students during class time at no cost, for which student attendance is mandatory. Information on HPis for selected health theme areas is available elsewhere.<sup>26</sup> HPI availability was measured by asking: “In the past year, has your school offered any health-promoting interventions in which participation is expected at the group, class, grade, or school level to address ...?”, followed by a list of eight themes (physical activity/active living, sex education, healthy eating, bullying/exclusion, personal safety/injury prevention, mental health and well-being, oral health, tobacco control). Response options were Yes or No.

Participants were then asked to select one HPI offered within the last three years, to respond to specific questions related to planning, implementing and sustaining that specific HPI. Questionnaire items were developed *de novo* or drawn or adapted from questionnaires used in

previous work.<sup>28</sup> A retired school principal with more than 30 years' experience working in Quebec schools was centrally instrumental in developing the questionnaires. English and French questionnaires were pilot-tested by asking nine retired principals to narrate their thought processes as they interpreted the questions and formulated responses.

### **Ethics approval**

Ethics approval was obtained from the Centre hospitalier de l'Université de Montréal (CHUM) Ethics Review Committee (2013-4130, CE 12.307).

### **Study variables**

*HPI theme area* addressed by the HPI selected for in-depth questions was measured by asking: "What aspect(s) of your students' health and well-being does [name of intervention] primarily address?", followed by a list of 12 theme areas (smoking prevention, tobacco control education, aggressive behaviour, mental health [e.g. anxiety], bullying/cyberbullying, physical activity, healthy eating, addiction prevention, personal hygiene, puberty, personal safety/injury prevention, oral health). Descriptions of selected HPIs for each theme area are reported elsewhere.<sup>26</sup>

*Perceived success of the HPI* selected was measured using four items: (1) [intervention] met all objectives; (2) abandoning [intervention] had/would have a negative effect on the students; (3) [intervention] had a positive impact on students; and (4) animators enjoyed working on [intervention]. Participants responded to each item using a 5-point Likert-type response scale ranging from 1 (strongly disagree) to 5 (strongly agree). To create a mean score, responses were summed and divided by the number of items to which participants responded. Cronbach alpha for the score was 0.7. To provide evidence for convergent construct validity, we correlated perceived

success against perceived permanence of the HPI (not at all, moderately, very permanent); the correlation coefficient was 0.27 ( $p < 0.01$ ). Although perceived success does not measure whether the intervention actually resulted in behaviour change, it is a relevant indicator, since school principals who perceive an HPI as successful are more likely to invest resources and effort in its sustainability and in implementing other HPIs.<sup>29</sup>

Potential correlates of perceived success of the HPI were selected based on factors known to be associated with successful HPIs<sup>30</sup> and on availability of data in PromeSS. These included 11 school-related variables, namely *number of students* (range 37.0–889.0); *number of (full- and part-time) teachers* (range 5.0–58.0); *language of instruction* (English, French); *percent of students in nutrition support program* (range 0.0–100.0); *school neighbourhood* (*urban, suburban, rural*); *teacher turnover* (15.1% had no turnover in past three years); *parent/community engagement in school* (range 1.8–5.0); *school/teacher commitment to student health* (range 1.1–4.9); *school physical environment* (range 1.1–5.0); and *principal leadership* (range 2.6–5.0).

In addition, each school was ranked according to the 2016-2017 *school deprivation indicator*,<sup>31</sup> which is a composite score based on data for each student within the school reflecting whether the mother had completed high school and whether both parents were employed full-time. Scores ranged from 1 (lowest deprivation) to 10 (highest deprivation) and for descriptive purposes, schools were grouped into three categories: schools serving very advantaged students (i.e. school deprivation score = 1–3), those serving moderately advantaged students (4–7) and those serving disadvantaged (8–10) students.

Eight potential correlates related to the structural characteristics of the HPI were investigated: *number of years HPI had been available in the school* (range 1–43); *number of competencies*

*addressed by HPI (range 1–6); grades that received the HPI (yes/no for every grade); HPI was ... a special event (yes/no), a pedagogical activity (yes/no) or a program (yes/no); number of learning strategies used in the HPI (range 0–4); and whether the school had a primary partner for the HPI (yes/no).*

Nine potential correlates related to planning/implementing the HPI were studied: *presence of implementation team leader (yes/no); number of implementation team members (range 2–42); HPI modified prior to implementation (yes/no); HPI modified during implementation (yes/no); school preparedness (range 1.0–5.0); program champion (at adoption or implementation stage) (yes/no); number of types of evaluations conducted (range 0–7); school board involved in implementation (yes/no); and whether HPI was developed de novo (by the school) or adopted/adapted from an existing HPI.*

Participant characteristics included *sex, age, current position in school (principal, vice-principal, teacher), highest level of education completed, and number of years of experience in current school (range 1.0–10.0) and number of years at current position (range 1.0–10.0).*

Appendix A (available upon request) describes each potential correlate in detail, including questionnaire item(s), response options, coding for analysis and Cronbach alpha for scales.

### **Data Analysis**

We used descriptive statistics to characterize study schools and participants. To avoid issues of multiple testing, each potential correlate was investigated independently as a single hypothesis, and only two statistical tests (i.e. an unadjusted and a multivariable linear regression model) were performed for each potential correlate.<sup>32,33</sup> All multivariable models were adjusted for number of

students, language of instruction, school neighbourhood and school deprivation. We did not test an omnibus model including all potential correlates, since this approach can be affected by an underdeveloped understanding of the possible relationships across all variables (especially in a cross-sectional study design), which can result in bias from over- or unnecessary adjustment. Data were analyzed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA). All statistical tests were two-sided, with the significance level set at 0.05.

## **RESULTS**

### **School characteristics**

The study sample included 171 elementary schools that were similar to all eligible elementary schools in Quebec ( $n = 1795$ ). Specifically, 21% of schools in our sample served very advantaged students versus 24% of all eligible elementary schools; 44% versus 39% served moderately advantaged students and 36% versus 38% served disadvantaged students.<sup>31</sup> French was the official language in 83% of school boards in our sample versus 90% overall. The median number of students per school ( $n = 267$ ) was similar to that in all eligible schools ( $n = 259$ ).<sup>26</sup> One-quarter (25%) of study schools were located in urban neighbourhoods, 36% were suburban and 40% were rural. School principals reported French as the mother tongue of 98% of students. Finally, 42% of participants reported high teacher turnover and 22% reported high school principal turnover.

### **Participant characteristics**

Sixty-nine percent of participants were female and almost all (97%) were the school principal. Mean (SD) age was 47.3 (7.4) years (range 30–60 years). Participants had worked a mean (SD) of



3.4 (2.6) years (range 1–10) in their current school and 7.1 (3.4) years in their current position (range 1–10).<sup>26</sup>

### **Description of HPIs**

HPIs selected for in-depth questions by the participant often addressed more than one theme area (e.g. physical activity and healthy eating; bullying and mental health). Among the 171 schools studied, 154 different HPIs were reported. More than half (58%) of HPIs addressed physical activity (e.g. daily 15-minute walk for students and staff); 43% addressed healthy eating (e.g. healthy cooking workshop animated by the teacher); 30% addressed personal safety and/or injury prevention (e.g. workshop in conjunction with improved policy to promote safe walking and biking to school); 26% focussed on bullying; 25% targeted aggressive behaviour (e.g. in-class conversations animated by teachers or psychosocial staff); and 21% addressed mental health (e.g. teacher-led workshop to teach young children to verbalize emotions through storytelling). Few HPIs selected by participants for in-depth questions addressed personal hygiene (9%), puberty (6%), addiction prevention (5%), oral health (3%) or tobacco prevention and education (2%).

### **Perceived success of HPIs**

Scores for perceived success of HPIs ranged from 2.3 to 5.0, with a mean (SD) of 4.3 (0.5). The assumption of normality in the distribution of scores was supported.<sup>34</sup>

### **Correlates of perceived success**

Results of the multivariable linear regression analyses adjusting for number of students, language of instruction, school neighbourhood and school deprivation indicated that four of 11 school

characteristics were associated with perceived success of the HPI including *lower teacher turnover, school physical environment, school/teacher commitment to student health and principal leadership* (Table 1). No variable describing structural characteristics of the HPI was associated with perceived success (Table 2). Finally, only one of nine variables related to HPI planning or implementation was related to perceived success. Specifically, *being a developer* (vs. an adopter) of the HPI related to higher scores of perceived success (Table 3).

Table 1. Unstandardized beta ( $\beta$ ) coefficients and 95% confidence interval (CI) from linear regression models for the association between school characteristics and perceived success of school-based health-promoting interventions (HPis), Project PromeSS, 2016-19 (n=163)

	n	Perceived success Mean (SD)	$\beta_{\text{unadj}}$ (95% CI)	$\beta_{\text{adjusted}}^a$ (95% CI)
No. students <sup>c</sup>				
37-267	81	4.25 (0.51)	0.00 (-0.04, 0.04) <sup>b</sup>	0.00 (-0.06, 0.06) <sup>b</sup>
267-889	81	4.26 (0.52)		
No. teachers <sup>c</sup>			0.00 (-0.01, 0.01)	-0.01 (-0.03, 0.02)
5-18	67	4.26 (0.49)		
19-37	81	4.24 (0.51)		
≥38	15	4.31 (0.66)		
Language of instruction				
French	136	4.22 (0.51)	ref	ref
English	27	4.43 (0.49)	0.21 (0.00, 0.42)	0.21 (0.00, 0.43)
% of students in nutrition support program <sup>c</sup>			0.00 (0.00, 0.00)	0.00 (-0.01, 0.00)
0	105	4.29 (0.53)		
1-100	50	4.18 (0.49)		
School neighborhood				
Urban/Suburban	98	4.25 (0.51)	ref	ref
Rural	65	4.25 (0.52)	0.00 (-0.08, 0.08)	0.01 (-0.10, 0.11)
School deprivation <sup>c</sup>			0.00 (-0.03, 0.03)	0.00 (-0.04, 0.03)
High	34	4.32 (0.47)		
Moderate	71	4.21 (0.58)		
Low	58	4.27 (0.46)		
Teacher turnover <sup>c</sup>			<b>0.12 (0.03, 0.21)</b>	<b>0.13 (0.04, 0.21)</b>
Several	17	4.03 (0.54)		
Some	52	4.21 (0.52)		
Few	61	4.22 (0.49)		
None (in >3 years)	31	4.46 (0.46)		
Parent/community engagement in school <sup>c</sup>			0.02 (-0.10, 0.15)	0.04 (-0.09, 0.18)
<3.8	70	4.24 (0.49)		
≥3.8	93	4.26 (0.54)		
School physical environment <sup>c</sup>			<b>0.21 (0.08, 0.34)</b>	<b>0.20 (0.07, 0.33)</b>
<3.6	88	4.15 (0.50)		
≥3.6	75	4.37 (0.51)		
School/teacher commitment to student health <sup>c</sup>			<b>0.25 (0.11, 0.39)</b>	<b>0.28 (0.13, 0.42)</b>
<4.0	46	4.08 (0.55)		
≥4.0	117	4.32 (0.48)		
Principal leadership <sup>c</sup>			<b>0.19 (0.03, 0.36)</b>	<b>0.20 (0.04, 0.37)</b>
<3.9	86	4.14 (0.50)		
≥3.9	60	4.36 (0.48)		

Note. Bold indicates confidence intervals that do not include the null. Totals do not always sum to 163 because of missing data. The beta coefficient represents the change in perceived success for every 1-unit change in the correlate.

<sup>a</sup>All models adjusted for number of students, language of instruction, school neighborhood and school deprivation.

<sup>b</sup>The estimate represents a change in the number of students per 100.

<sup>c</sup>Responses for continuous potential correlates were categorized for descriptive purposes, and the mean (SD) was computed for each group. However, these variables were retained as continuous in the modeling.

Table 2. Unstandardized beta ( $\beta$ ) coefficients and 95% confidence interval (CI) from linear regression models for the association between eight structural characteristics of school-based health-promoting interventions (HPIs) and perceived success of HPI, Project PromeSS, 2016-19 (n=163)

	n	Perceived success Mean (SD)	$\beta_{\text{crude}}$ (95% CI)	$\beta_{\text{adjusted}}^a$ (95% CI)
No. years HPI in school <sup>b</sup>				
1	32	4.17 (0.56)	0.08 (-0.04, 0.20)	0.10 (-0.03, 0.23)
2-5	85	4.25 (0.53)		
$\geq 6$	36	4.33 (0.43)		
No. of competencies addressed in HPI <sup>b</sup>			0.05 (0.00, 0.10)	0.04 (-0.02, 0.09)
1	58	4.28 (0.50)		
2	42	4.09 (0.56)		
3-6	63	4.34 (0.48)		
All grades received HPI				
No	56	4.36 (0.46)	ref	ref
Yes	107	4.20 (0.53)	-0.16 (-0.33, 0.01)	-0.15 (-0.32, 0.02)
HPI was a special event <sup>c</sup>				
No	114	4.29 (0.54)	ref	ref
Yes	49	4.17 (0.45)	-0.13 (-0.30, 0.05)	-0.11 (-0.29, 0.07)
HPI was a pedagogical activity <sup>c</sup>				
No	114	4.25 (0.55)	ref	ref
Yes	49	4.25 (0.42)	0.00 (-0.18, 0.17)	0.01 (-0.17, 0.19)
HPI was a program <sup>c</sup>				
No	93	4.22 (0.46)	ref	ref
Yes	70	4.29 (0.58)	0.07 (-0.09, 0.23)	0.04 (-0.13, 0.20)
No. learning strategies <sup>b,d</sup>			0.05 (-0.03, 0.14)	0.04 (-0.05, 0.13)
1	71	4.21 (0.57)		
2	55	4.23 (0.48)		
3	26	4.41 (0.41)		
4	11	4.26 (0.52)		
School worked with a partner				
No	50	4.31 (0.56)	ref	ref
Yes	113	4.23 (0.49)	-0.09 (-0.26, 0.09)	-0.09 (-0.26, 0.09)

Note. Bold indicates confidence intervals that do not include the null. Totals do not always sum to 163 because of missing data. The beta coefficient represents the change in perceived success for every 1-unit change in the correlate.

<sup>a</sup>All models adjusted for number of students, language of instruction, school neighborhood and school deprivation.

<sup>b</sup>Responses for continuous potential correlates were categorized for descriptive purposes, and the mean (SD) was computed for each group. However, these variables were retained as continuous in the modeling.

<sup>c</sup>Participants were instructed to choose all responses that applied to the questionnaire item: (Name of intervention) was a... 1) special event (e.g. health fair, guest speaker at an assembly, etc.) (specify); 2) pedagogical activity; 3) learning and evaluation situation; 4) program (specify); 5) other (specify)

<sup>d</sup>Participants were instructed to choose all responses that applied to the questionnaire item: What type of learning strategy was used for (Name of intervention)? 1) lecture strategies: presentations, demonstrations; 2) individual work: independent practice; 3) interactive teaching strategies: group discussion, role-play, modeling; 4) social constructivist teaching strategies: peer education, tutoring, collaborative and cooperative learning; 5) other (specify)

Table 3. Unstandardized beta ( $\beta$ ) coefficients and 95% confidence intervals (CI) from linear regression models for the association between nine factors related to planning/implementing school-based health-promoting interventions (HPIs) and perceived success of HPI, Project PromeSS, 2016-19 (n=163)

	n	Perceived success Mean (SD)	$\beta_{\text{crude}}$ (95% CI)	$\beta_{\text{adjusted}}^a$ (95% CI)
No. implementation team members <sup>b,c</sup>				
2-4	50	4.31 (0.39)		
5-42	41	4.18 (0.54)	-0.01 (-0.03, 0.01)	-0.01 (-0.03, 0.01)
Implementation team leader <sup>c</sup>				
No	27	4.17 (0.45)	ref	ref
Yes	65	4.28 (0.48)	0.12 (-0.10, 0.33)	0.10 (-0.12, 0.31)
HPI modified prior to implementation				
No	96	4.23 (0.49)	ref	ref
Yes	48	4.30 (0.52)	0.07 (-0.11, 0.24)	0.05 (-0.13, 0.23)
HPI modified during implementation				
No	65	4.23 (0.51)	ref	ref
Yes	98	4.27 (0.52)	0.04 (-0.13, 0.20)	0.04 (-0.12, 0.21)
School preparedness <sup>b</sup>				
0-2.75	90	4.17 (0.55)	<b>0.09 (0.01, 0.17)</b>	0.08 (0.00, 0.16)
$\geq 2.76$	73	4.36 (0.45)		
Program champion				
No	55	4.14 (0.54)	ref	ref
Yes	106	4.30 (0.49)	0.16 (-0.01, 0.33)	0.14 (-0.03, 0.32)
No. of types of evaluation <sup>b,d</sup>				
0	3	4.06 (0.82)		
1	14	4.27 (0.69)		
2	21	4.17 (0.48)		
3	37	4.12 (0.55)		
4	44	4.30 (0.47)		
5	21	4.23 (0.45)		
6-7	23	4.48 (0.43)		
School board involved in implementation				
No	116	4.20 (0.52)	ref	ref
Yes	30	4.36 (0.40)	0.16 (-0.04, 0.37)	0.18 (-0.03, 0.38)
School....				
developed HPI	97	4.35 (0.45)	ref	ref
adopted HPI	66	4.12 (0.57)	<b>-0.23 (-0.39, -0.07)</b>	<b>-0.24 (-0.40, -0.08)</b>

Note. Bold indicates confidence intervals that do not include the null. Totals do not always sum to 163 because of missing data. The beta coefficient represents the change in perceived success for every 1-unit change in the correlate.

<sup>a</sup>All models adjusted for number of students, language of instruction, school neighborhood and school deprivation.

<sup>b</sup>Responses for continuous potential correlates were categorized for descriptive purposes, and the mean (SD) was computed for each group. However, these variables were retained as continuous in the modeling.

<sup>c</sup>Only HPI's with team members responded to this question

<sup>d</sup>Participants were instructed to choose all responses that applied for the questionnaire item: Did your school do any of the following to evaluate (Name of intervention)? 1) Hold regular meetings; 2) Obtain feedback from the (name of intervention) animators; 3) Document the extent to which implementation was carried out in accordance with the plan; 4) Document the number of students participating in the (name of intervention); 5) Document the barriers and facilitators to implementation; 6) Formally evaluate the outcomes of the (name of intervention); 7) Other (specify).

## **DISCUSSION**

In this study of Quebec elementary schools, we drew on our conceptual model depicting key elements to consider in the delivery of school-based HPIs, to select potential correlates of perceived success. Although school principals generally perceived HPIs as highly successful, there was variability in perceived success scores, and five factors emerged as correlates. These pertained to school characteristics and to planning and implementing HPIs, but none of the HPI structural characteristics investigated were retained.

### **School characteristics**

Because both the environment and the “actors” involved in a school-based intervention can influence how an intervention is delivered and whether it produces the intended effects,<sup>35</sup> we investigated the context of health promotion programming<sup>36</sup> according to school-level correlates. Among 11 variables describing school characteristics, four (i.e. lower teacher turnover, school physical environment, school/teacher commitment to student health, principal leadership) were associated with perceived HPI success.

First, frequent turnover of school staff could challenge HPI implementation because of lack of continuity, changes in staff priorities and motivation and loss of the “corporate history.”<sup>37</sup> It may be prudent for educators and HPI developers to incorporate training larger numbers of staff in HPI implementation, and to foster institutionalizing HPIs into the school curriculum.<sup>24</sup>

Second, as in earlier studies,<sup>24</sup> HPIs were perceived as more successful when components of school culture, including school physical environment, school/teacher commitment to student health and principal leadership, were rated higher. School culture represents the shared beliefs and norms of

the school<sup>38</sup> and encompasses the operational processes and motivations that guide HPI delivery. Availability of equipment and space can provide school staff with greater latitude in their HPI choice, increasing their probability of selecting an intervention that fits with the school context.

Third, school/teacher commitment to student health, which reflects emphasis on and commitment to health promotion by school staff, may positively influence how HPIs are perceived within schools where staff believe in their relevance.<sup>39</sup>

Finally, because school principals are central in guiding staff towards objectives, obtaining resources, distributing responsibilities and solving conflicts,<sup>40</sup> their leadership can be key. Multiple studies stress the need for strong leadership to facilitate HPI delivery.<sup>41-45</sup>

### **HPI characteristics**

Roger's diffusion theory<sup>25</sup> posits that perceptions of the relative advantage, compatibility, complexity, trialability and observability of an intervention are key in selecting and evaluating interventions. We investigated characteristics of HPIs in two categories—structural characteristics and planning and implementation.

Structural characteristics represent features of the HPI such as target audience and learning strategies used to transmit health knowledge and affect behaviour change. Among eight variables in this category, none were associated with perceived success, although other studies do report that these features are associated with HPI effectiveness. In a systematic review, school-based substance use programs were more effective when focussed on competencies including social skills, self-control and problem-solving.<sup>46</sup> A review of obesity prevention interventions for preschool children identified interactive learning strategies, such as modelling, as key.<sup>47</sup> In our

study, rather than focus on HPIs targeting a specific theme, we assessed a broad range of correlates of perceived success of diverse HPIs. Regardless of this heterogeneity, principals regarded most interventions as highly successful, suggestive that correlates other than structural factors might contribute more to perceived success.

We investigated nine characteristics related to planning and implementing HPIs. Based on Rogers' diffusion theory,<sup>25</sup> planning is the first phase of HPI delivery, comprising identification of a need for the HPI in the school and learning about alternate HPIs that can respond to that need.<sup>48</sup> Schools may seek information on existing interventions, be solicited by HPI developers or develop an HPI themselves. Implementation comprises delivering the intervention to students and may involve continuous adjustment to the school context.<sup>27</sup> In this study, the only planning and implementation characteristic associated with perceived success was that the "school developed its own HPI." Staff may feel more ownership of HPIs developed in-house, which may lead to higher levels of commitment and trust in expected benefits.<sup>35,49</sup> It is possible that in-house development produced HPIs better tailored to the school context, since school personnel likely have a well-developed understanding of their students' needs.

### **Strengths and limitations**

Strengths of this study include that it examines numerous correlates of perceived success across a wide variety of HPIs. In addition, although PromeSS included a convenience sample of schools, which could limit generalizability,<sup>50</sup> the characteristics of PromeSS schools resembled those of all eligible elementary schools in Quebec.



Limitations include that, although responses from a single person within a school may not provide an accurate portrayal of the organizational perspective, data collection from multiple respondents within the same school was not feasible. However, the PromeSS questionnaire was sent to participants in advance of the interview so that participants could consult their staff in preparation for the interview. Our measure of perceived success was created *de novo*. Until its validity and reliability are established, the interpretation of absolute differences between scores remains uncertain. Further, responses were right-skewed (i.e. more participants perceived success favourably), which limited variability and may have rendered detection of correlates more difficult. Recall error could have resulted in misclassification bias in the observed associations. Finally, the precision of estimates in PromeSS was limited because of the relatively small sample size.

## **CONCLUSION**

School personnel in elementary schools generally perceived that school based HPIs are highly successful. Correlates of perceived success include low teacher turnover, positive school physical environment, school/teacher commitment to student health, principal leadership and developing the HPI *de novo*. If replicated in other independent studies, these factors should be considered by HPI developers and school personnel when planning and implementing HPIs in schools.

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**Appendix H. Additional publication: Availability of health-promoting interventions in high schools in Québec, Canada by level of school deprivation.**

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## **ABSTRACT**

**Introduction:** School-based health-promoting interventions (HPIs) foster adolescent health and wellbeing. However, access to HPIs may differ by school deprivation. We describe perceived importance of health issues and availability of HPIs and extracurricular activities (ECAs) by school deprivation in high schools in Québec, Canada.

**Methods:** During the 2016/17, 2017/18, and 2018/19 school years, we interviewed school principals or a designee in 48 public high schools classified as disadvantaged (33%) or advantaged (67%). Schools rated whether 13 common health-related issues were important (i.e., warranted intervention) in their student population and reported whether HPIs to address these or other health issues, and/or ECAs for sports or special interest groups had been available in their school in the past year.

**Results:** 84% of disadvantaged schools had offered  $\geq 1$  HPI in the past year compared to 73% of advantaged schools. Higher proportions of disadvantaged schools perceived most of 13 health-related issues as important. HPIs for bullying/exclusion, sex education, and physical activity (issues subject to government mandates) were available in most schools. Higher proportions of disadvantaged schools offered non-mandated HPIs (i.e., for healthy eating, mental health/wellbeing, and drug use). All schools offered an array of ECAs, but higher proportions of advantaged schools reported ECAs in all areas except non-competitive sports.

**Conclusions:** Government mandates appear to facilitate universal availability of HPIs in schools, possibly contributing to boosting equity in school-based health promotion. However, in addition to availability, further investigation of possible differences in the content, implementation and/or effects of HPIs based on school deprivation is warranted.



**Keywords:** health-promoting schools; high schools; adolescents; social inequalities; cross-sectional

### **Highlights**

- Higher proportions of disadvantaged schools considered unhealthy eating, alcohol use, cigarette smoking, aggressive behaviour, and sexually transmitted infections as important health issues; higher proportions of advantaged schools considered suicide risk and self-harm as important health issues
- 84% of disadvantaged schools reported  $\geq 1$  health-promoting intervention (HPI) in the past year, compared to 73% of advantaged schools
- HPis for bullying/exclusion, sex education and physical activity (issues subject to government mandates) were available in most schools
- Notably higher proportions of disadvantaged schools offered HPis related to healthy eating, mental health, and drug use
- Most schools offered assorted ECAs, but higher proportions of advantaged schools reported ECAs of all types except non-competitive sports

## INTRODUCTION

After decades of being viewed as secondary to maternal and child health, the promotion and protection of adolescent health is now recognized as warranting specific consideration and government funding. Attitudes, beliefs, and habits that impact health and wellbeing in adulthood often develop during adolescence, and early health promotion efforts can positively influence these attributes.<sup>1</sup> The World Health Organization underscored the importance of developing and implementing health-promoting interventions (HPIs) for youth in its call to action to "improve and maintain the health of the world's one billion adolescents."<sup>2, p. 1</sup>

Schools are ideal settings for promoting adolescent health because most youth attend school. In 2020/21, 96% of Canadian 15-year-olds, 94% of 16-year-olds and 78% of 17-year-olds attended high school.<sup>3</sup> In Québec during 2019/20, 98%, 97%, 97% and 93% of 14-, 15-, 16- and 17-year-olds, respectively, were enrolled in school (Ministère de l'Éducation Québec, internal data, 25 August 2022). Drawing on the principles of the Ottawa Charter for Health Promotion, the Health-Promoting Schools framework is increasingly recognized for its potential to support positive development and healthy behaviours in adolescents.<sup>4,5</sup> This framework aims to promote health and learning using three main approaches: health promotion through the school curriculum and activities; health promotion through the social and physical environment; and involvement of families and the community.<sup>6</sup> Inherent in these approaches is the importance of adaptation to school context. School stakeholders are intended to identify needs in their school and introduce interventions to address these needs, so that all interventions are tailored to the school context.<sup>7</sup> Delivering HPIs to foster adolescent health through schools optimizes universal access across all socioeconomic settings and supports the goals of the World Health Organization initiative 'Making

Every School a Health-Promoting School'.<sup>8</sup> Health and Education ministries in all Canadian provinces and territories have committed to promoting health in schools.

Government mandates may be key in ensuring equitable access HPIs. In 2012, the province of Québec, Canada required all schools in Québec to address bullying and exclusion through HPIs and/or school policies.<sup>9</sup> In 2018, it mandated delivery of school-based HPIs targeting sex education,<sup>10</sup> and in 2017, it adopted a province-wide policy encouraging adolescents to engage in physical activity (PA) for  $\geq 60$  minutes/day.<sup>11</sup> To attain these mandates, school boards and schools have broad discretion in HPI content, format and delivery. In addition to health issues signaled as important by government mandates, schools can identify other areas of concern and develop or adopt HPIs to address these additional concerns.

School-sponsored extracurricular activities (ECAs) complement the educational curriculum and provide opportunities for students to engage voluntarily in pursuits such as individual and team sports, music and art, and special interest clubs.<sup>12</sup> Participation in ECAs can help young people learn new skills, boost academic performance, broaden social skills, and improve time management.<sup>13</sup> We consider ECAs as well as HPIs herein on the premise that ECAs may complement HPIs in creating a health-promoting school.

The Health Promoting Schools framework (which guided this study), is recognized as the most promising approach to building healthy school communities.<sup>14</sup> However, although supporting equity by emphasizing a whole-school approach, the framework does not explicitly mention equitable distribution of HPIs across schools. Despite known challenges in disadvantaged schools

(e.g., lack of resources, work overload)<sup>15,16</sup> and government mandates, there is little empirical evidence that school-based HPIs are equitably available across different socioeconomic settings.<sup>17,18</sup> Our objectives were to describe perceived importance of student health issues among school staff, and the availability of related HPIs and ECAs in Québec public high schools, according to school deprivation.

## **METHODS**

Project PromeSS comprises two cross-sectional surveys that investigate social inequalities in HPI availability in primary and high schools across Quebec. In phase 1 (2016-2019), data were collected in a telephone survey of elementary and high school administrators.<sup>18,19</sup> The second phase (2023-24) extends phase 1 in a second cross-sectional survey to determine whether availability of HPIs and ECAs has changed since the COVID-19 pandemic.<sup>19</sup> In the current study, we drew data from the first survey to address our study objectives.

### ***Study population***

Recruitment of schools was conducted in two stages. First, 69 of the 72 school boards within the Ministère de l'Éducation et de l'Enseignement supérieur of Québec (MEE)<sup>20</sup> were contacted in 2016 for permission to invite schools under their purview to participate in PromeSS. Because they are not assigned a deprivation indicator by the MEE, private schools, schools serving special needs students, and schools with  $\leq 30$  students were excluded. The 69 school boards approached oversaw 436 high schools.

Approval was obtained from 32 school boards (46%), overseeing 170 high schools (39% of all public high schools in Québec); 31 school boards declined and 6 did not respond to our outreach. Once approval was obtained, we mailed/mailed an introductory letter advising each eligible school of an upcoming telephone contact by our research team. One week later, a team member (i.e., a retired principal who had worked in the Québec school system for three decades) contacted school principal to ask for assent to participate. Contact was established with school principals in 77 high schools (42% of high schools in consenting school boards); 48 assented and completed the interview. The 48 schools represented 62% of eligible, and 28% of all public high schools in Québec.

### ***Procedures***

Data were collected during the 2016/17, 2017/18, and 2018/19 school years in structured telephone interviews with school principals or a designee (who were required to have been in their current position for  $\geq 6$  months). In pilot work, we asked nine retired school principals to narrate their thoughts as they interpreted and formulated responses to the questions. Interviews (median length 52 minutes) were conducted by trained interviewers in French or English.

### ***Ethics approval***

The Centre de recherche du Centre Hospitalier de l'Université de Montréal Ethics Review Committee approved the study. The ethics approval certificate (2013-4130, CE 12.307) was submitted to all school boards, and subsequently to school principals on request.

### ***Interview questions***

*Perceived importance of health issues* was assessed by: "In the past year, how important was each of the following health issues for students? That is, would the issue require special attention or intervention within your school?" with response options *extremely important, very important, important* coded as important and *not very important, not at all important* coded as not important. The query was followed by a list of 13 health issues common among high school students, selected from domains assessed in the Health Behaviour in School-Age Children study of Canadian adolescents in grades 6 to 10 (i.e., PA/sedentary behaviour, mental health problems, healthy/unhealthy eating habits, substance use, bullying/cyberbullying, aggressive behaviour, sexual health).<sup>21</sup> We also included attention deficit hyperactivity disorder (ADHD), which affects 5-7% of youth worldwide<sup>22</sup> and is associated with adverse outcomes academically and vocationally.<sup>23</sup>

*Availability of health-promoting interventions* was measured by: "In the past year, has your school offered any health-promoting interventions in which participation is expected at the group, class, grade or school-level to address.....? (i) PA/active living (not including physical education classes that are part of the curriculum); (ii) sex education (e.g., teen pregnancy, STI prevention, etc.); (iii) bullying/exclusion; (iv) healthy eating; (v) personal safety and injury prevention (e.g., potential risks at home, in community, outdoors; safe use of technology); (vi) mental health/wellbeing; (vii) multi-component/issue (i.e., substance use including drugs, alcohol and tobacco); (viii) other?" (yes/no).

*Availability of extracurricular activities* was measured by: "In the past year, has your school offered any of the following types of extracurricular activities in which participation is

voluntary? (i) competitive sports (extramural); (ii) non-competitive sports (intramural); (iii) physical activities (e.g., dance, ski, martial arts, fitness class); (iv) free gym; (v) special interest clubs (e.g., chess, math, computer coding, robotics); (vi) artistic clubs (e.g., music, theatre, art); (vii) other?" (yes/no).

Classification of *school deprivation* level was based on a school deprivation index (Indice de milieu socio-économique (IMSE)), assigned by the MEE to all public schools with >30 students, that reflects the degree to which students in each school are socioeconomically advantaged or disadvantaged. The index considers whether both parents are employed and whether mothers completed high school.<sup>24</sup> Schools are assigned a decile rank from 1 (least deprived/advantaged) to 10 (most deprived/disadvantaged). We classified schools with IMSE 8–10 as disadvantaged and schools with IMSE 1–7 as advantaged. Additional school characteristics included *number of students* (range: 13–2,835), *number of teachers* (range: 4–225), *teacher turnover in the past 3 years* (none/few (low); some/several (high)), *principal turnover in the past 3 years* (0–1 principal change (low);  $\geq 2$  (high)), *language of instruction* (French, English), and *proportion of students identified by school staff as being at risk of poor academic outcomes because of physical disabilities, behavioural difficulties, social maladjustment or learning difficulties that might affect learning or behaviour* (range: 7.5–100%). Using data from the 2016 Canadian Census, we matched school postal codes to population centres categorized as rural (population <1,000); small (1,000–29,999); medium (30,000–99,999); or large (>100,000).<sup>25</sup> We grouped schools into two categories: rural/small or medium/large. School principal/designee characteristics included sex, level of education, current position (principal, vice principal, teacher, other), and number of years working in their current positions.

### *Data analysis*

We report the proportion of disadvantaged vs. advantaged schools that: (i) viewed each health issue as important; (ii) that offered each HPI; and (iii) that offered each ECA. Because this is a descriptive study, we followed the Strengthening the Reporting of Observational Studies in Epidemiology guidelines to omit statistical testing.<sup>26</sup>

## **RESULTS**

The mean(SD) age of interviewees was 46.6(6.9) years, 56% were female, and 58% had a post-graduate diploma/certificate or degree. Most (n=29) were school principals; 5 were vice-principals, 8 were teachers and 6 had other roles. On average, interviewees had worked in their current position for 8.5 (SD=2.7) years; 63% had >10 years of experience. Sixteen of the 48 study schools (33.3%) were classified as disadvantaged (i.e., serving disadvantaged students). The remainder were classified as advantaged (i.e., serving moderately to highly advantaged students).

Table 1 presents characteristics of participating schools comparing, when possible, with all high schools in Quebec. PromeSS schools resembled all high schools across Quebec in school deprivation, language, and number of students.



Table 1. Characteristics of high schools retained in the sample compared to all high schools in Québec, Project PromeSS, 2017/19.

	<b>PromeSS schools</b>	<b>All high schools in Québec</b>
	<b>(n = 48)</b>	<b>(n = 436)</b>
School deprivation, % <sup>a,b</sup>		
Advantaged schools	66.7	60.5
Disadvantaged schools	33.3	39.5
Language of instruction in school board, % <sup>a,b</sup>		
French	83.3	87.0
English	16.7	13.0
No. students in school, <i>Mdn</i> (IQR)	713 (799)	608 (726)
No. teachers in school, <i>Mdn</i> (IQR)	57 (56.5)	N/A
Size of school community, % <sup>a</sup>		
Rural/Small	45.8	N/A
Medium/Large	54.2	N/A
Percent students in single-parent households, <i>M</i> (SD)	42.6 (17.3)	N/A
Percent students in low-income families, <i>M</i> (SD)	39.7 (26.0)	N/A
Percent students at risk, <i>M</i> (SD)	43.0 (24.2)	N/A
High teacher turnover, % <sup>a</sup>	54.2	N/A
High principal turnover, % <sup>a</sup>	14.6	N/A

<sup>a</sup>Denominators exclude missing data.

<sup>b</sup>Data extracted from published governmental reports.

### ***Importance of health issues***

Regardless of school deprivation level, the top six health concerns reported by schools as important (i.e., warranting special attention and/or intervention) were ADHD, mental health

problems, bullying, lack of PA, unhealthy eating, and substance use. More specifically, ADHD and problems related to mental health were considered important by 90% and 83% of schools, respectively (Table 2). Fewer, although still a majority (65–69%), perceived bullying, lack of PA, unhealthy eating, and drug use as problematic. Half of schools endorsed alcohol use, cigarette smoking, and suicide risk as important problems, and a minority perceived that aggressive behaviour (38%), self-harm (29%), sexually transmitted infections (27%), and teen pregnancy (17%) were important problems in their school.

Higher proportions of disadvantaged schools reported that unhealthy eating (75% vs. 59%), alcohol use (56% vs. 44%), cigarette smoking (56% vs. 41%), aggressive behaviour (50% vs. 31%), and sexually transmitted infections (38% vs. 22%) were important health issues. Higher proportions of advantaged schools reported that suicide risk (50% vs 38%) and self-harm (34% vs. 19%) were important.

Table 2. Proportion of schools that perceived specific health issues as important, by school deprivation level, Project PromeSS, 2017/19

		<b>Disadvantaged Schools<sup>a</sup> (n = 16)</b>	<b>Advantaged Schools<sup>a</sup> (n = 32)</b>
	<b>Total %</b>	<b>% (95% CI)<sup>b</sup></b>	<b>% (95% CI)<sup>b</sup></b>
Attention deficit hyperactivity disorder	90	88 (63, 98)	91 (75, 98)
Problems with mental health	83	88 (63, 98)	81 (64, 91)
Lack of physical activity	69	75 (50, 90)	66 (48, 80)
Bullying (including cyberbullying)	67	63 (40, 83)	69 (51, 82)

		<b>Disadvantaged Schools<sup>a</sup> (n = 16)</b>	<b>Advantaged Schools<sup>a</sup> (n = 32)</b>
	<b>Total</b>	<b>% (95% CI)<sup>b</sup></b>	<b>% (95% CI)<sup>b</sup></b>
	<b>%</b>		
Unhealthy eating	65	75 (50, 90)	59 (42, 75)
Drug use	65	63 (40, 83)	66 (48, 80)
Alcohol use	48	56 (33, 77)	44 (26, 61)
Cigarette smoking	46	56 (33, 77)	41 (25, 58)
Suicide risk	46	38 (18, 61)	50 (34, 66)
Aggressive behaviour	38	50 (28, 72)	31 (18, 49)
Self-harm	29	19 (6, 44)	34 (20, 52)
Sexually transmitted infections	27	38 (18, 61)	22 (11, 39)
Teen pregnancy	17	19 (6, 44)	16 (6, 32)

<sup>a</sup>All schools with  $\geq 30$  students across Quebec are ranked in deciles according to a province-wide school deprivation indicator (IMSE), with scores ranging from 1 (not deprived) to 10 (very deprived). Schools were grouped into two categories based on the IMSE score: (i) disadvantaged schools (IMSE 8–10) which serve disadvantaged students; and (ii) advantaged schools (IMSE 1–7) which serve advantaged students.

<sup>b</sup>95% Agresti-Coull (modified Wald) confidence intervals (CI) were calculated.

### ***HPI availability***

Overall, the proportion of schools offering HPIs was higher for issues subject to government mandates. HPIs addressing sex education and bullying/exclusion were available in 94% and 89% of schools, respectively and 79% offered HPIs relating to PA/active living. Although not mandated, HPIs addressing personal safety and injury prevention, and healthy eating were offered by 81% and 77% of schools, respectively. Two-thirds of schools offered

HPIs focused on mental health/well-being and drug use. Only 57% of schools offered tobacco control HPIs.

The mean (95% CI) proportion of disadvantaged schools offering HPIs was 84% (75%, 93%) compared to 73% (64%, 82%) of advantaged schools (Table 3). Relatively more disadvantaged schools offered HPIs related to healthy eating (88% vs. 71%), mental health/wellbeing (75% vs. 61%), and drug use (75% vs 59%).

Table 3. Proportion of schools offering health-promoting interventions (HPIs) in the past year according to school deprivation level, Project PromeSS, 2017/19

	<b>Total</b>	<b>Disadvantaged Schools<sup>a</sup> (n = 16)</b>	<b>Advantaged Schools<sup>a</sup> (n = 32)</b>
	<b>%</b>	<b>% (95% CI)<sup>b</sup></b>	<b>% (95% CI)<sup>b</sup></b>
Physical activity/active living	79	75 (50, 90)	81 (64, 91)
Sex education	94	100 (77, 103)	90 (74, 97)
Bullying/exclusion	89	94 (70, 101)	87 (71, 95)
Healthy eating	77	88 (63, 98)	71 (53, 84)
Personal safety and injury prevention	81	81 (56, 94)	81 (64, 91)
Mental health/well-being	66	75 (50, 90)	61 (44, 76)
Drug use	65	75 (50, 90)	59 (42, 75)
Tobacco control	57	63 (40, 83)	55 (38, 71)

<sup>a</sup>All schools with ≥30 students across Quebec are ranked in deciles according to a province-wide school deprivation indicator (IMSE), with scores ranging from 1 (not deprived) to 10 (very deprived). Schools were grouped into two categories based on the IMSE score: (i) disadvantaged schools (IMSE 8–10)

which serve disadvantaged students; and (ii) advantaged schools (IMSE 1–7) which serve advantaged students.

<sup>b</sup>95% Agresti-Coull (modified Wald) confidence intervals (CI) were calculated.

### *ECA availability*

Most schools offered an array of ECAs (Table 4). Compared to disadvantaged schools, relatively more advantaged schools offered ECAs in all areas except non-competitive sports.

Table 4. Proportion of schools offering extracurricular activities in the past year according to school deprivation level, *Project PromeSS*, 2017/19

	<b>Total</b>	<b>Disadvantaged Schools<sup>a</sup> (n = 16)</b>	<b>Advantaged Schools<sup>a</sup> (n = 32)</b>
	<b>%</b>	<b>% (95% CI)<sup>b</sup></b>	<b>% (95% CI)<sup>b</sup></b>
Competitive sports	92	81 (56, 94)	97 (83, 101)
Non-competitive sports	81	81 (56, 94)	81 (64, 91)
Physical activities	88	75 (50, 90)	94 (79, 99)
Free gym	79	69 (44, 86)	84 (68, 94)
Special interest clubs	85	69 (44, 86)	94 (79, 99)
Artistic clubs	92	81 (56, 94)	97 (83, 101)

<sup>a</sup>All schools with  $\geq 30$  students across Quebec are ranked in deciles according to a province-wide school deprivation indicator (IMSE), with scores ranging from 1 (not deprived) to 10 (very deprived). Schools were grouped into two categories based on the IMSE score: (i) disadvantaged schools (IMSE 8–10) which serve disadvantaged students; and (ii) advantaged schools (IMSE 1–7) which serve advantaged students.

<sup>b</sup>95% Agresti-Coull (modified Wald) confidence intervals (CI) were calculated.

## DISCUSSION

In this study, we sought to describe health issues that school personnel perceived as important enough to warrant intervention in their school, and whether related HPIs and ECAs were distributed equitably in high schools across Québec. Five key findings emerged: (i) relatively more disadvantaged schools reported that unhealthy eating, alcohol use, cigarette smoking, aggressive behaviour, and sexually transmitted infections were important; relatively more advantaged schools reported that suicide risk and self-harm were important; (ii) 84% of disadvantaged schools had offered  $\geq 1$  HPI in the past year compared to 73% of advantaged schools; (iii) HPIs addressing bullying/exclusion, sex education, and PA (issues subject to government mandates) were available in most schools; (iv) relatively more disadvantaged schools offered HPIs related to healthy eating, mental health and wellbeing, and drug use; and (v) most schools offered an array of ECAs, but relatively more advantaged schools reported ECAs in all areas except non-competitive sports.

### *Social inequalities*

We explored whether social inequalities were apparent in HPI availability across high schools in Québec. Despite marked differences in perceived importance of numerous health issues in disadvantaged vs. advantaged schools, we did not find evidence of inequalities in HPI availability. In fact, relatively more disadvantaged schools offered  $\geq 1$  HPI in the past year, and higher proportions of disadvantaged schools offered healthy eating, mental health/wellbeing, and substance use HPIs. At least two explanations may underpin this finding.

First, regardless of school deprivation, most high schools in Québec appear to meet their government-mandated responsibility to offer HPIs in specific areas. There were however interesting discrepancies between perceived importance of several health-related issues and HPI offerings. For example, 89% of schools offered bullying/exclusion HPIs, although only 67% cited bullying as important; and 79% of schools offered PA/active living HPIs while only 69% cited lack of PA as important. It may be of value to explore the underpinnings of these discrepancies. Overall however, these data suggest that government mandates promote equitable access to HPIs across the spectrum of student socioeconomic advantage. It is of note that we did not assess the frequency or intensity of the HPIs, their implementation, or their impact. It is possible that despite equivalence in availability, these other aspects do differ across student socioeconomic status.

Second, it is possible that the greater availability of several HPIs in disadvantaged schools reflects recognition among school personnel that students in their schools needed interventions in these areas, and that they had the will and resources to implement HPIs that responded to these needs. This greater availability in disadvantaged schools may well be positive if the HPIs offered did indeed have a positive impact on student health and well-being.

### ***Sex education***

Sex education was widely offered in Québec high schools as per the government mandate, but sexually transmitted diseases and teen pregnancy were generally perceived as unimportant issues, perhaps signalling some complacency regarding teen sexual health. Tremendous progress has been made on teen pregnancy in recent decades. The fertility rate

among women ages 15–19 in Canada fell from 17 per 1,000 females in 2000 to 5.5 in 2020,<sup>27</sup> likely reflecting changes in social norms, better access and public acceptance of adolescents' use of contraception, and sex education (Personal communication, Institut national de santé publique du Québec, 2 May 2022). However, the prevalence of sexually transmitted infections has been rising sharply. Between 2008 and 2017, the prevalence of chlamydia, gonorrhea and infectious syphilis increased by 10%, 38%, and 86%, respectively, among 15–19-year-old Canadians.<sup>28</sup> Motivating adolescents to protect themselves against sexually transmitted infections (e.g., through condom use) is vital. Although the Canadian Paediatric Society in 2018 endorsed long-acting reversible contraceptive methods as the primary option for youth contraception,<sup>29</sup> female U.S. high school students who used these methods were 60% less likely to also use condoms compared to peers who used oral contraceptives.<sup>30</sup> Moreover, 13% of Québec adolescents reported difficulty accessing their preferred method of contraception, citing cost and access to confidential care as primary barriers.<sup>31</sup> Adequate sex education remains a key public health imperative in this vulnerable population, and health promotion efforts depend on universal delivery of effective school-based programs.<sup>32</sup>

### ***Mental health and substance use***

A majority of schools viewed mental health problems as important. Experiencing adversity (e.g., parental divorce, family violence, abuse and neglect, economic hardship) is common among youth. More than half of 10,000 U.S. 13-17-year-olds encountered at least one childhood adversity, and 70–98% of these adolescents reported multiple adversities, which were strongly associated with diagnoses of post-traumatic stress disorder, dysthymia and major depression, ADHD, and alcohol abuse/dependence.<sup>33</sup> Although numerous school-based HPIs



aimed at improving mental health have been evaluated,<sup>34,35</sup> one-third of high schools in our sample did not offer HPIs related to mental health/wellbeing or to alcohol, tobacco or drug use, suggestive that there is room for improvement. Mandating school-based HPIs to promote mental health/wellbeing and prevent substance use may be pivotal to reducing the notably high healthcare and societal burden attributable to these issues.<sup>36</sup> Moreover, facilitating universal access across all socioeconomic settings to HPIs that focus not only on preventing mental illness but also on promoting resilience and general emotional wellbeing<sup>37</sup> will support recovery from the COVID-19 pandemic, which jeopardized adolescents' mental health/wellbeing, and heightened socioeconomic inequalities.<sup>38-40</sup>

Suicide risk and self-harm reflect mental health and wellbeing. Suicide is the second leading cause of death among 15–34-year-old Canadians.<sup>41</sup> Although adolescents are less likely than young adults to die after attempting suicide, adolescent females are more likely than their older counterparts to be hospitalized with a self-inflicted injury.<sup>41</sup> Moreover, suicide attempts and deaths are related to socioeconomic disadvantage. Individual (e.g., low parental education) and contextual (e.g., characteristics of the neighborhood or community) socioeconomic disadvantage increases the risk for suicide ideation, attempts and deaths.<sup>42-44</sup> Development and implementation of school-based HPIs that increase emotional resilience, coping skills and self-efficacy might mitigate these risks.<sup>45</sup>

However, suicide ideation and behaviours intended to cause self-harm can be hidden from view<sup>46</sup> and more difficult to notice than risky behaviours (e.g., drug use, impaired or distracted driving) or other mental health concerns (e.g., inability to focus, anxiety, depression,

aggression or conduct disorder problems) which can be observed by school personnel and others. This may have contributed to our finding that many schools, regardless of school deprivation level, did not identify suicide and self-harm as important issues. Schools may not have experienced a suicide or suicide attempt among their students, and more frequently observed issues might take precedence. Staff training around HPIs focused on mental health/wellbeing should incorporate information that can help school staff identify adolescents at risk of suicide and self-harm and assist them in finding necessary help.<sup>47</sup>

Finally, two-thirds of schools cited drug use and almost half cited alcohol use and cigarette smoking as important health issues, and corresponding proportions of schools reported that HPIs for drug use and tobacco control, respectively had been available in the past year. Given the long-standing pervasiveness of “experimentation” with substance use among adolescents, the recent surge in the use of electronic cigarettes, cannabis legalization in Canada in 2018, as well as growing concerns about concurrent use of multiple psychoactive substances, it may be timely to reflect on whether universal access to HPIs addressing substance use might be a prudent public health policy.

### ***Future research***

Research is needed in other provinces and territories to document perceptions of school personnel of important student health issues as well as availability of related HPIs and ECAs; to examine HPI implementation practices, barriers and facilitators; and to study student-level outcomes relevant to HPIs implemented in their schools. Continued research documenting

differences in HPIs across disadvantaged and advantaged schools may help inform the content and targeting of school-based health promotion.

### ***Limitations***

The small sample size in PromeSS limits the precision of our findings. PromeSS recruited a convenience sample of high schools. Although similar in several characteristics to all high schools in Québec, the PromeSS sample may not have been fully representative. Data were collected from a single interviewee in each school, which may not fully represent the organizational perspective. However, the questionnaire was sent to school principals before the interview so that they could consult their staff to prepare. Finally, we collected data prior to the COVID-19 pandemic and the findings may not reflect availability of HPIs during or post-pandemic.

### **CONCLUSION**

Although our findings need replication in other provinces and territories, government mandates appear to facilitate universal availability of HPIs in schools, possibly contributing to boosting equity in access to school-based health promotion. However, in addition to availability, further study is needed to investigate possible differences in the content, implementation and/or effects of HPIs based on school deprivation. If HPI availability and/or impact do differ by school deprivation, this variation may need to be considered by program and policy planners.

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## Appendix I. Comparison of Article 2 results with the Pampalon and IMSE measures of school deprivation

Table 1. Mean scores for four dimensions of health-promoting school culture according to school deprivation operationalized using Pampalon measures (n=171)

	n	Mean (SD)	One-way ANOVA Omnibus Test p-value
<b>School/teacher commitment to student health</b>			
Social deprivation quintiles <sup>a</sup>			0.075
Q1 (least deprived)	33	4.23 (0.54)	
Q2	35	4.25 (0.45)	
Q3	32	3.99 (0.62)	
Q4	32	4.10 (0.54)	
Q5 (most deprived)	29	3.95 (0.47)	
Material deprivation quintiles <sup>a</sup>			0.082
Q1 (least deprived)	18	4.19 (0.48)	
Q2	27	3.87 (0.59)	
Q3	35	4.08 (0.58)	
Q4	36	4.23 (0.46)	
Q5 (most deprived)	45	4.16 (0.51)	
<b>School physical environment</b>			
Social deprivation quintiles <sup>a</sup>			0.939
Q1 (least deprived)	33	3.72 (0.72)	
Q2	35	3.64 (0.59)	
Q3	32	3.64 (0.66)	
Q4	32	3.59 (0.57)	
Q5 (most deprived)	29	3.60 (0.63)	
Material deprivation quintiles <sup>a</sup>			0.117
Q1 (least deprived)	18	3.91 (0.47)	
Q2	27	3.66 (0.53)	
Q3	35	3.45 (0.63)	
Q4	36	3.71 (0.69)	
Q5 (most deprived)	45	3.61 (0.65)	
<b>Parent/community engagement in the school</b>			
Social deprivation quintiles <sup>a</sup>			0.001
Q1 (least deprived)	33	4.04 (0.57) <sup>b</sup>	
Q2	35	3.99 (0.53) <sup>c</sup>	
Q3	32	3.68 (0.65)	
Q4	32	3.64 (0.57)	
Q5 (most deprived)	29	3.52 (0.66) <sup>b,c</sup>	
Material deprivation quintiles <sup>a</sup>			0.584
Q1 (least deprived)	18	4.00 (0.55)	
Q2	27	3.81 (0.68)	
Q3	35	3.72 (0.58)	
Q4	36	3.78 (0.58)	
Q5 (most deprived)	45	3.74 (0.68)	
<b>Ease of principal leadership</b>			
Social deprivation quintiles <sup>a</sup>			0.196
Q1 (least deprived)	30	4.00 (0.52)	
Q2	29	3.87 (0.49)	
Q3	28	3.86 (0.55)	
Q4	28	3.77 (0.47)	
Q5 (most deprived)	24	3.68 (0.42)	
Material deprivation quintiles <sup>a</sup>			0.453

Q1 (least deprived)	18	3.92 (0.52)	
Q2	27	3.67 (0.45)	
Q3	35	3.87 (0.52)	
Q4	36	3.86 (0.52)	
Q5 (most deprived)	45	3.87 (0.49)	

<sup>a</sup>The distribution of social and material deprivation of the school neighborhood was divided into quintiles by the Institut national de santé publique du Québec (INSPQ) and used as is; 1<sup>st</sup> quintile is least deprived and 5<sup>th</sup> is most deprived. The mean (SD) was computed separately for descriptive purposes; the variable was used continuously in the models.

<sup>b,c</sup>Tukey-Kramer Post Hoc test: means with the same letter indicate a significant difference. Any difference between two means carrying different letters is significant at  $p > 0.05$ .

Table 2. Mean scores for four dimensions of health-promoting school culture according to school deprivation operationalized using the Indice de milieu socioéconomique (IMSE) (n=171)

	n	Mean (SD)	One-way ANOVA Omnibus Test p-value
<b>School/teacher commitment to student health</b>			
IMSE deciles			0.178
1-3 (Advantaged school)	35	4.24 (0.46)	
4-7 (Moderately advantaged school)	75	4.04 (0.57)	
8-10 (Disadvantaged school)	61	4.13 (0.51)	
<b>School physical environment</b>			
IMSE deciles			0.036
1-3 (Advantaged school)	35	3.77 (0.63) <sup>a</sup>	
4-7 (Moderately advantaged school)	75	3.69 (0.55)	
8-10 (Disadvantaged school)	61	3.46 (0.72) <sup>a</sup>	
<b>Parent/community engagement in the school</b>			
IMSE deciles			0.001
1-3 (Advantaged school)	35	4.11 (0.53) <sup>b,c</sup>	
4-7 (Moderately advantaged school)	75	3.74 (0.65) <sup>b</sup>	
8-10 (Disadvantaged school)	61	3.60 (0.63) <sup>c</sup>	
<b>Ease of principal leadership<sup>†</sup></b>			
IMSE deciles			0.834
1-3 (Advantaged school)	35	3.84 (0.48)	
4-7 (Moderately advantaged school)	75	3.82 (0.56)	
8-10 (Disadvantaged school)	61	3.87 (0.44)	

<sup>a,b,c</sup>Tukey-Kramer Post Hoc test: means with the same letter indicate no significant difference. Any difference between two means carrying different letters is significant at 5%

<sup>†</sup>Excludes n=25 participants missing data

## Appendix J. Comparison of Article 1 results using the IMSE calculated with 2011 vs 2016

### Census data

At the time of data collection for the PromeSS study and when we started conducting analyses, the IMSE indicator had been calculated by the Québec Ministry of Education using data from the 2011 Canadian Census. In 2019, we were made aware that new IMSE indicators had been released, which had been calculated using data from the 2016 Canadian Census. We conducted sensitivity analyses for Article 1 using the new indicators.

Table 1. Perceived importance of health issues and availability of health-promoting interventions according to IMSE school deprivation indicator calculated using 2011 census data (n=171) and 2016 census data (n=169).

	IMSE calculated using 2011 census data <sup>a,b</sup>			IMSE calculated using 2016 census data <sup>a</sup>		
	Disadvantaged (n=61) %	Moderately advantaged (n=75) %	Very advantaged (n=35) %	Disadvantaged (n=64) %	Moderately advantaged (n=70) %	Very advantaged (n=35) %
<i>Health issue perceived as important</i>						
Attention deficit hyperactivity disorder	79	80	77	78	80	80
Aggressive behavior	74	69	57	70	70	63
Mental health problems	57	68	71	56	74	63
Inadequate sleep	71	63	49	63	69	49
Lack of respect for safety	69	59	51	64	63	51
Bullying and exclusion	64	59	57	61	64	51
Concerns about puberty	57	52	54	56	53	54
Lack of physical activity	62 <sup>c</sup>	52 <sup>c</sup>	29 <sup>c</sup>	59	51	34
Unhealthy eating	69 <sup>c</sup>	51 <sup>c</sup>	23 <sup>c</sup>	64 <sup>c</sup>	51 <sup>c</sup>	29 <sup>c</sup>
Infections, viruses, parasites	56	39	43	53	43	40
Problems with personal hygiene	51 <sup>c</sup>	31 <sup>c</sup>	20 <sup>c</sup>	47	31	26
Dental health problems	51 <sup>c</sup>	23 <sup>c</sup>	17 <sup>c</sup>	45 <sup>c</sup>	21 <sup>c</sup>	14 <sup>c</sup>
Cigarette smoking <sup>b</sup>	5	5	3	5	3	9
<i>Health-promoting intervention present</i>						
Dental health	95	93	94	94	94	94
Bullying and exclusion	89	91	91	91	89	91
Physical activity/active living	87	89	91	86	91	89
Sex education	90	81	83	86	87	77
Healthy eating	82	69	69	75	73	71
Personal safety and injury prevention	51	37	51	47	43	46
Mental health and well-being	30 <sup>c</sup>	43 <sup>c</sup>	60 <sup>c</sup>	30	49	49
Tobacco control	13	8	6	11	9	9

<sup>a</sup>All schools with at least 30 students across Quebec are ranked according to a province-wide deprivation indicator (IMSE), with scores ranging from 1 (highest SES) to 10 (lowest SES). Schools were grouped into three categories based on the IMSE score: very advantaged (IMSE 1-3), moderately advantaged (IMSE 4-7) or disadvantaged (IMSE 8-10).

<sup>b</sup>Data reported in Article 1.

<sup>c</sup>Chi-square test significant at  $p < 0.01$ .

From Article 1:

Table S5. Relative risks and 95% confidence intervals from unadjusted modified Poisson regression models for perceived importance of health issue by school deprivation level<sup>a</sup> PromeSS study, Québec, Canada, 2017-19.

Health issue	School deprivation indicator <sup>a</sup>		
	Disadvantaged vs. moderately advantaged (ref)	Moderately vs. very advantaged (ref)	Disadvantaged vs. very advantaged (ref)
Attention deficit hyperactivity disorder	1.0 (0.8, 1.2)	1.0 (0.8, 1.3)	1.0 (0.8, 1.3)
Aggressive behavior	1.1 (0.9, 1.3)	1.2 (0.9, 1.7)	1.3 (0.9, 1.8)
Mental health <sup>b</sup>	0.8 (0.7, 1.1)	1.0 (0.7, 1.2)	0.8 (0.6, 1.1)
Inadequate sleep	1.1 (0.9, 1.4)	1.3 (0.9, 1.9)	1.5 (1.0, 2.1)
Lack of respect for safety	1.2 (0.9, 1.5)	1.1 (0.8, 1.7)	1.3 (0.9, 1.9)
Bullying <sup>b</sup>	1.1 (0.8, 1.4)	1.0 (0.7, 1.5)	1.1 (0.8, 1.6)
Concerns about puberty <sup>b</sup>	1.1 (0.8, 1.5)	1.0 (0.7, 1.4)	1.1 (0.7, 1.5)
Lack of physical activity	1.2 (0.9, 1.6)	<b>1.8 (1.0, 3.2)<sup>c</sup></b>	<b>2.2 (1.2, 3.8)<sup>c</sup></b>
Unhealthy eating	<b>1.4 (1.0, 1.8)<sup>c</sup></b>	<b>2.2 (1.2, 4.3)<sup>c</sup></b>	<b>3.0 (1.6, 5.7)<sup>c</sup></b>
Infections, viruses, parasites	<b>1.4 (1.0, 2.1)<sup>c</sup></b>	0.9 (0.6, 1.5)	1.3 (0.8, 2.0)
Problems with personal hygiene <sup>b</sup>	<b>1.7 (1.1, 2.5)<sup>c</sup></b>	1.5 (0.7, 3.2)	<b>2.5 (1.3, 5.2)<sup>c</sup></b>
Dental health problems	<b>2.7 (1.6, 4.7)<sup>c</sup></b>	1.1 (0.5, 2.6)	<b>3.0 (1.4, 6.4)<sup>c</sup></b>
Cigarette smoking <sup>b</sup>	0.9 (0.2, 4.0)	1.9 (0.2, 16.2)	1.7 (0.2, 16.0)

Separate regression models were constructed for each health issue.

<sup>a</sup>All schools with at least 30 students across Québec are ranked according to a school deprivation indicator (IMSE), with scores ranging from 1 (lowest deprivation) to 10 (highest deprivation)<sup>31</sup>. Schools were grouped into three categories based on the IMSE score: schools serving very advantaged (IMSE 1-3), moderately advantaged (IMSE 4-7) or disadvantaged (IMSE 8-10) students.

<sup>b</sup>School principals provided data for specific grade levels.

<sup>c</sup>Bold indicates that the 95% confidence intervals do not include the value of 1.

Sensitivity analysis:

Table S5. Relative risks and 95% confidence intervals from unadjusted modified Poisson regression models for perceived importance of health issue by school deprivation level<sup>a</sup> PromeSS study, Québec, Canada, 2017-19.

Health issue	School deprivation indicator <sup>a</sup>		
	Disadvantaged vs. moderately advantaged (ref)	Moderately vs. very advantaged (ref)	Disadvantaged vs. very advantaged (ref)
Attention deficit hyperactivity disorder	1.0 (0.8, 1.2)	1.0 (0.8, 1.2)	1.0 (0.8, 1.2)
Aggressive behavior	1.0 (0.8, 1.3)	1.1 (0.8, 1.5)	1.1 (0.8, 1.5)
Mental health <sup>b</sup>	0.8 (0.6, 1.0)	1.2 (0.9, 1.6)	0.9 (0.6, 1.3)
Inadequate sleep	0.9 (0.7, 1.2)	<b>1.4 (1.0, 2.1)</b>	1.3 (0.9, 1.9)
Lack of respect for safety	1.0 (0.8, 1.3)	1.2 (0.8, 1.8)	1.2 (0.9, 1.8)
Bullying <sup>b</sup>	1.0 (0.7, 1.2)	1.3 (0.9, 1.8)	1.2 (0.8, 1.7)
Concerns about puberty <sup>b</sup>	1.1 (0.8, 1.5)	1.0 (0.7, 1.4)	1.0 (0.7, 1.5)
Lack of physical activity	1.2 (0.9, 1.6)	1.5 (0.9, 2.5)	<b>1.7 (1.0, 2.9)</b>
Unhealthy eating	1.2 (0.9, 1.7)	<b>1.8 (1.0, 3.2)</b>	<b>2.2 (1.3, 3.9)</b>
Infections, viruses, parasites	1.2 (0.9, 1.8)	1.3 (0.8, 2.1)	1.1 (0.7, 1.7)
Problems with personal hygiene <sup>b</sup>	<b>1.5 (1.0, 2.3)</b>	1.2 (0.6, 2.4)	<b>1.8 (1.0, 3.4)</b>
Dental health problems	<b>2.1 (1.3, 3.6)</b>	1.5 (0.6, 3.8)	<b>3.2 (1.3, 7.5)</b>

Cigarette smoking <sup>b</sup>	1.6 (0.3, 9.6)	0.3 (0.1, 1.9)	0.5 (0.1, 2.6)
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Separate regression models were constructed for each health issue.

<sup>a</sup>All schools with at least 30 students across Québec are ranked according to a school deprivation indicator (IMSE), with scores ranging from 1 (lowest deprivation) to 10 (highest deprivation)<sup>31</sup>. Schools were grouped into three categories based on the IMSE score: schools serving very advantaged (IMSE 1-3), moderately advantaged (IMSE 4-7) or disadvantaged (IMSE 8-10) students.

<sup>b</sup>School principals provided data for specific grade levels.

<sup>c</sup>Bold indicates that the 95% confidence intervals do not include the value of 1.

### From Article 1:

Table S7. Relative risk and 95% confidence intervals from unadjusted modified Poisson regression models for the availability of specific health-promoting interventions at school, according to school deprivation level<sup>a</sup>, PromeSS study, Québec, Canada, 2017-19.

Health-promoting intervention	School deprivation indicator <sup>a</sup>		
	Disadvantaged vs. moderately advantaged (ref)	Moderately vs. very advantaged (ref)	Disadvantaged vs. very advantaged (ref)
Dental health <sup>b</sup>	1.0 (0.9, 1.1)	1.0 (0.9, 1.1)	1.0 (0.9, 1.1)
Bullying and exclusion <sup>b</sup>	1.0 (0.9, 1.1)	1.0 (0.9, 1.1)	1.0 (0.8, 1.1)
Physical activity/active living <sup>b</sup>	1.0 (0.9, 1.1)	1.0 (0.9, 1.1)	1.0 (0.8, 1.1)
Sex education <sup>b</sup>	1.1 (1.0, 1.3)	1.0 (0.8, 1.2)	1.1 (0.9, 1.3)
Healthy eating	1.2 (1.0, 1.4)	1.0 (0.8, 1.3)	1.2 (0.9, 1.5)
Personal safety and injury prevention	1.4 (0.9, 2.0)	0.7 (0.5, 1.1)	1.0 (0.7, 1.5)
Mental health and well-being	0.7 (0.4, 1.1)	0.7 (0.5, 1.0)	<b>0.5 (0.3, 0.8)<sup>c</sup></b>
Tobacco control	1.6 (0.6, 4.5)	1.4 (0.3, 6.6)	2.3 (0.5, 10.3)

Separate models were constructed for each health-promoting intervention.

<sup>a</sup>All schools with at least 30 students across Québec are ranked according to a province-wide school deprivation indicator (IMSE), with scores ranging from 1 (lowest deprivation) to 10 (highest deprivation)<sup>20</sup>. Schools were grouped into three categories based on the IMSE score: schools serving very advantaged (IMSE 1-3), moderately advantaged (IMSE 4-7) or disadvantaged (IMSE 8-10) students.

<sup>b</sup>Intervention is government-mandated (see Supplementary Table 4).

<sup>c</sup>Bold indicates that the 95% confidence intervals do not include the value of 1.

### Sensitivity analysis:

Table S7. Relative risk and 95% confidence intervals from unadjusted modified Poisson regression models for the availability of specific health-promoting interventions at school, according to school deprivation level<sup>a</sup>, PromeSS study, Québec, Canada, 2017-19.

Health-promoting intervention	School deprivation indicator <sup>a</sup>		
	Disadvantaged vs. moderately advantaged (ref)	Moderately vs. very advantaged (ref)	Disadvantaged vs. very advantaged (ref)
Dental health <sup>b</sup>	1.0 (0.9, 1.1)	1.0 (0.9, 1.1)	1.0 (0.9, 1.1)
Bullying and exclusion <sup>b</sup>	1.0 (0.9, 1.1)	1.0 (0.8, 1.1)	1.0 (0.9, 1.1)
Physical activity/active living <sup>b</sup>	0.9 (0.8, 1.1)	1.0 (0.9, 1.2)	1.0 (0.8, 1.1)
Sex education <sup>b</sup>	1.0 (0.9, 1.1)	1.1 (0.9, 1.4)	1.1 (0.9, 1.4)
Healthy eating	1.0 (0.8, 1.3)	1.0 (0.8, 1.3)	1.0 (0.8, 1.4)
Personal safety and injury prevention	1.1 (0.8, 1.6)	0.9 (0.6, 1.5)	1.0 (0.7, 1.6)
Mental health and well-being	0.6 (0.4, 1.0)	1.0 (0.7, 1.5)	0.6 (0.4, 1.0)
Tobacco control	1.3 (0.5, 3.6)	1.0 (0.3, 3.8)	1.3 (0.4, 4.6)

Separate models were constructed for each health-promoting intervention.

<sup>a</sup>All schools with at least 30 students across Québec are ranked according to a province-wide school deprivation indicator (IMSE), with scores ranging from 1 (lowest deprivation) to 10 (highest deprivation)<sup>20</sup>. Schools were grouped into three categories based on the IMSE score: schools serving very advantaged (IMSE 1-3), moderately advantaged (IMSE 4-7) or disadvantaged (IMSE 8-10) students.

<sup>b</sup>Intervention is government-mandated (see Supplementary Table 4).

<sup>c</sup>Bold indicates that the 95% confidence intervals do not include the value of 1.

## Appendix K. Curriculum vitae

### CURRICULUM VITAE

# JODI KALUBI

## EDUCATION

- 2018 – ...      **PhD Public Health** (Health Promotion)  
École de santé publique, Université de Montréal  
*Co-supervisors : Jennifer O’Loughlin & Louise Potvin*
- 2017 – ...      **MSc Public Health** – *fast track to PhD*  
École de santé publique, Université de Montréal  
*Supervisor : Jennifer O’Loughlin*
- 2014 – 2017      **BSc(N) Nursing**  
Ingram School of Nursing, McGill University

## PROFESSIONAL EMPLOYMENT

- 01/2022 – 08/2022      **Research Coordinator**, Data collection  
APPLE Schools, Chair in Early Life Interventions  
MAP Centre for Urban Health Solutions, St Michaels Hospital, Toronto
- 06/2021 – 01/2022      **Research Coordinator**, Data collection  
NDIT Study Cycle 24 – Qualitative  
Centre de recherche du CHUM
- 04/2020 – 10/2020      **Nurse Consultant**, COVID-19 case management  
RRSSS Nunavik
- 01/2019 – 07/2019      **Research Assistant**  
PromeSS Study  
Centre de recherche du CHUM
- 06/2017 – 08/2018      **Nurse Clinician**, Pneumology & Oncology Unit  
Hôpital Charles-Lemoyne

## SCHOLARSHIPS AND AWARDS

2022	Scholarship for doctoral students, Desjardins Foundation ( <b>5000\$</b> )
2022	Travel Award, Centre de recherche en santé publique ( <b>445\$</b> )
2021 – 2022	Doctoral scholarship, Ordre des infirmières et infirmiers du Québec ( <b>39 000\$</b> )
2020 – 2021	Doctoral scholarship, Ordre des infirmières et infirmiers du Québec ( <b>39 000\$</b> )
2019 – 2020	Doctoral scholarship, Ordre des infirmières et infirmiers du Québec ( <b>39 000\$</b> )
2019	Travel Award, Université de Montréal ( <b>446\$</b> )
2019	Travel Award, Centre de recherche du CHUM ( <b>700\$</b> )
2019	Travel Award, FAÉCUM ( <b>500\$</b> )
2019	Jury 1 <sup>st</sup> prize 10-min oral presentations, AEESPUM Student Conference ( <b>200\$</b> )
2018	Scholarship for fast-track to PhD, Université de Montréal ( <b>10 000\$</b> )
2018	Jury 1 <sup>st</sup> prize 3-min oral presentations, AEESPUM Student Conference ( <b>150\$</b> )
2018	Excellence Award MSc Public Health, Université de Montréal ( <b>5666\$</b> )

## RESEARCH FUNDING

2022 – 2024	Changes in public health programming in Québec schools following the COVID-19 pandemic. <u>Québec Ministry of Health and Social Services</u> . ( <b>536 158\$</b> ). With Jennifer O’Loughlin (PI), Erin O’Loughlin, Annie Pelekanakis, Teodora Riglea, Marie-Pierre Sylvestre.
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## TEACHING AND MENTORSHIP EXPERIENCE

01/2023	<b>Programme de formation des auxiliaires d’enseignement</b> Centre de pédagogie universitaire, Université de Montréal
01/2022 – 03/2022	<b>Teaching Assistant</b> , “Stratégies populationnelles en promotion de la santé” (MSO 6623) with Louise Potvin École de santé publique, Université de Montréal
02/2021 – 08/2021	<b>Peer mentor</b> , 1 PhD student École de santé publique, Université de Montréal
02/2021 – 05/2021	<b>Teaching Assistant</b> , “Épidémiologie sociale” (MSO 6615) with Katherine Frohlich École de santé publique, Université de Montréal
09/2017 – 12/2017	<b>Nursing Clinical Tutor</b> , “Pratique de soins – Santé communautaire” (SOI 3706) with Jean Lawrence Roy Faculté des sciences infirmières, Université de Montréal
09/2015 – 06/2017	<b>Peer mentor</b> , 2 BSc(N) students



## PUBLICATIONS

### Published/in-press

1. **Kalubi, J.**, Riglea, T., Wellman, R., Maximova, K., & O’Loughlin, J. (2023) Availability of health-promoting interventions in high schools in Québec, Canada by level of school deprivation. Accepted for publication at *Health Promotion and Chronic Disease Prevention in Canada*.
2. **Kalubi, J.**, Riglea, T., O’Loughlin, E., Potvin, L., & O’Loughlin, J. (2023) Health-promoting school culture: How do we measure it and does it vary by school neighborhood deprivation? *Journal of School Health*. <https://doi.org/10.1111/josh.13304>
3. Collonaz, M., Riglea, T., **Kalubi, J.**, O’Loughlin, J., Naud, A., Kestens, Y., Agrinier, N., & Minary, L. (2022). A methodological systematic review on the use of social network analysis to study health behaviours in adolescent populations. *Social Science and Medicine*, 315. <https://doi.org/10.1016/j.socscimed.2022.115519>
4. **Kalubi, J.**, O’Loughlin, E. (co-first authors), Riglea, T., Pelekanakis, A., & O’Loughlin, J. (2022). Correlates of perceived success of health-promoting interventions in elementary schools. *Health Promotion and Chronic Disease Prevention in Canada*, 42(9), 398-407. <https://doi.org/10.24095/hpcdp.42.9.03>
5. **Kalubi, J.**, Riglea, T. (co-first authors), Sylvestre, M. P., Maximova, K., Dutczak, H., Gariépy, G., & O’Loughlin, J. (2022). Social inequalities in availability of health-promoting interventions in Québec elementary schools. *Health Promotion International*, 1-11. <https://doi.org/10.1093/heapro/daab023>.
6. Pelekanakis, A., O’Loughlin, J. L., Maximova, K., Montreuil, A., **Kalubi, J.**, Dugas, E. N., & Sylvestre, M. P. (2021). Associations of Quantity Smoked and Socioeconomic Status with Smoke-Free Homes and Cars Among Daily Smokers. *Health Education & Behavior*, 1-9. <https://doi.org/10.1177/10901981211010437>.
7. **Kalubi, J.**, Tchouaga, Z., Ghenadenik, A., O’Loughlin, J., & Frohlich, K. L. (2020). Do Social Inequalities in Smoking Differ by Immigration Status in Young Adults Living in an Urban Setting? Findings From the Interdisciplinary Study of Inequalities in Smoking. *Tobacco Use Insights*, 13, 1-6. <https://doi.org/10.1177/1179173X20972728>.

### Manuscripts (under review/submitted)

1. Riglea, T., Dessy, T., **Kalubi, J.**, Goulet, D., Mbutiwi Ikwa Ndol, F., Williams, S., Engert, J. C., Chen, H. Y., O’Loughlin, J., & Sylvestre, M-P. Body Mass Index Modifies Genetic Susceptibility to High Systolic Blood Pressure in Adolescents and Young Adults: Results From An 18-Year Longitudinal Study. Submitted to *Genetic Epidemiology*.

### Manuscripts (in preparation)

1. **Kalubi, J.**, O’Loughlin, J., Riglea, T., Doré, I., & Potvin, L. Mental health-promoting interventions in elementary schools: school context correlates of availability and alignment with evidence-based practices. Under review at *Journal of School Psychology*.
2. **Kalubi, J.**, Perez Isaza, E.J., Riva, M., Mercille, G., Roncarolo, F., O’Loughlin, J., & Potvin, L.. Investigating social inequalities in food insecurity among first-time food bank users. In preparation for submission to the *Journal of Epidemiology and Community Health*.
3. **Kalubi, J.**, Riglea, T. (co-first authors), O’Loughlin, E., Pelekanakis, A., Maximova, K., & O’Loughlin, J. School- and program-related factors associated with the institutionalization of school-based health promotion interventions in Canada. In preparation for submission to *Implementation Science*.
4. Struik, L., Armasu, A., Fortin, G., Riglea, T., **Kalubi, J.**, Ferlatte, O., Naja, M., O’Loughlin, J., & Sylvestre, MP. Cannabis use among young adults during the COVID-19 pandemic.
5. Fortin, G., Struik, L., Armasu, A., **Kalubi, J.**, Riglea, T., Ferlatte, O., Sylvestre, MP., & O’Loughlin, J. Positive reframing of Covid-19 experience among young adults.
6. **Kalubi, J.**, Dabravolskaj, J., Veugelers, P., & Maximova, K. Mapping essential forms and functions of the APPLE Schools program.
7. **Kalubi, J.**, O’Loughlin, E., Naja, M., O’Loughlin, J., & Maximova, K. Do school-based health-promoting interventions for physical activity align with evidence-based practices?
8. **Kalubi, J.**, O’Loughlin, E., Naja, M., O’Loughlin, J., & Doré, I. Characterization of health-promoting interventions in schools for healthy eating: alignment with best practices and expected effectiveness.

#### Abstracts (published)

1. **Kalubi J.**, Bertrand Y, Dagenais B, Houde R, Marcoux S, Bujold M. (2020). Graduate students’ mental health: Exploring experiences of isolation and loneliness. *European Journal of Public Health*, Volume 30, Issue Supplement\_5, ckaa165.340, <https://doi.org/10.1093/eurpub/ckaa165.340>
2. **Kalubi J.**, Dugas EN, Wellman RJ, Sylvestre MP, O’Loughlin J. (2020). Natural course of smoking cessation and predictors of quitting in young adulthood. *European Journal of Public Health*, Volume 30, Issue Supplement\_5, ckaa165.1357, <https://doi.org/10.1093/eurpub/ckaa165.1357>
3. **Kalubi J.**, Tchouaga Z, Ghenadenik A, O’Loughlin J, Frohlich KL. (2020). Do social inequalities in smoking differ by immigration status in young adults? *European Journal of Public Health*, Volume 30, Issue Supplement\_5, ckaa165.831, <https://doi.org/10.1093/eurpub/ckaa165.831>
4. Doucette E, Chevrier A, Bigras C, D’Aquila V, **Kalubi J.**, Montanaro P, Riglea T. (2016). Navigating the Challenges of Delirium Management in the PICU: A Nursing Student’s Perspective in Providing a Strengths-Based Approach. *Canadian Journal of Critical Care Nursing*, 27(2).

#### INVITED TALKS

1. O'Loughlin J, **Kalubi J**, Riglea T, O'Loughlin E. Projet PromeSS: Résultats préliminaires. Ministry of Health and Social Services and Ministry of Education. Québec (Canada) [Online due to Covid-19], October 20, 2020.
2. **Kalubi J**, Bertrand Y, Dagenais B, Houde R, Marcoux S, Bujold M. Isolement étudiant aux cycles supérieurs de l'Université de Montréal: Étude qualitative exploratoire. Journée SantéCap organized by the Réseau de recherche en santé des populations du Québec (RRSPQ). Montréal (Canada), December 5, 2019.

## PEER-REVIEWED PRESENTATIONS

1. **Kalubi J**, O'Loughlin J, Riglea T, Doré I, Potvin L. Promotion de la santé mentale dans les écoles primaires : quels facteurs sont associés à la présence d'interventions dans les écoles et sont-elles alignées avec les données probantes? Abstract submitted to the Annual AEESPUM Student Conference. Montréal (Canada), April 5, 2023.
2. **Kalubi J**, Riglea T, Doré I, Potvin L, O'Loughlin J. Mental health-promoting interventions in elementary schools: school context correlates of availability and alignment with evidence-based practices. 17th World Congress on Public Health, Rome (Italy), May 2-6 2023.
3. Riglea T, **Kalubi J**, Doré I, O'Loughlin J. Facteurs associés à la présence d'interventions de promotion de la santé mentale dans les écoles primaires au Québec. 88e Congrès de l'Association francophone pour le savoir (Acfas) [Postponed to 2021 and online due to Covid-19]. Sherbrooke (Canada), May 3-7 2021.
4. **Kalubi J**, Dugas EN, Wellman RJ, Sylvestre MP, O'Loughlin J. Natural course of smoking cessation and predictors of quitting in young adulthood. 16th World Congress on Public Health, Rome (Italy) [Online due to Covid-19], October 12-17 2020.
5. **Kalubi J**, Tchouaga Z, Ghenadenik A, O'Loughlin J, Frohlich KL. Do social inequalities in smoking differ by immigration status in young adults? 16th World Congress on Public Health, Rome (Italy) [Online due to Covid-19], October 12-17 2020.
6. **Kalubi J**, Bertrand Y, Dagenais B, Houde R, Marcoux S, Bujold M. Graduate students' mental health: Exploring experiences of isolation and loneliness. 16th World Congress on Public Health, Rome (Italy) [Online due to Covid-19], October 12-17 2020.
7. **Kalubi J**, Bertrand Y, Dagenais B, Houde R, Marcoux S, Bujold M. Isolement étudiant aux cycles supérieurs de l'Université de Montréal: Étude qualitative exploratoire. Invited presentation to the Journée SantéCap organized by the Réseau de recherche en santé des populations du Québec (RRSPQ). Montréal (Canada), December 5, 2019.
8. **Kalubi J**, Bertrand Y, Dagenais B, Houde R, Marcoux S, Bujold M. L'isolement des étudiants en recherche aux cycles supérieurs de l'Université de Montréal. 87e Conférence de l'Association francophone pour le savoir (Acfas). Gatineau (Canada), May 27-31, 2019.

9. **Kalubi J**, Bertrand Y, Dagenais B, Houde R, Marcoux S, Bujold M. L'isolement des étudiants en recherche aux cycles supérieurs de l'Université de Montréal. Université de Montréal, Annual AEESPUM Student Conference. Montréal (Canada), May 2, 2019.
10. **Kalubi J**, Riglea T, Dutczak H, Datta G, Hanusaik N, O'Loughlin J. What Does the Literature Say About Social Disparities in School-Based Health Promotion Programming? Canadian Public Health Association (CPHA) Annual Conference Public Health 2019, Ottawa (Canada). April 30-May 2, 2019.
11. Riglea T, Dutczak H, **Kalubi J**, Hanusaik N, Sylvestre MP, Datta G, O'Loughlin J. Social disparities in the availability of school-based health promoting interventions in Québec. Canadian Public Health Association (CPHA) Annual Conference Public Health 2019. Ottawa (Canada), April 30-May 2, 2019.
12. **Kalubi J**, Riglea T, Dutczak H, Datta G, O'Loughlin J. Are There Social Disparities in School-Based Health Promotion Programming? A Scoping Review. 23<sup>rd</sup> International Union for Health Promotion and Education World Conference on Health Promotion. Rotorua (New Zealand), April 7-11, 2019.
13. Dutczak H, Hanusaik N, **Kalubi J**, Riglea T, Sylvestre MP, Datta G, Comeau L, Montreuil A, O'Loughlin J. Disparities in availability of health-promoting interventions in public schools in Québec. 23<sup>rd</sup> International Union for Health Promotion and Education World Conference on Health Promotion. Rotorua (New Zealand), April 7-11, 2019.
14. **Kalubi J**, O'Loughlin J, Hanusaik N, Dutczak H. Social Disparities in Uptake of School-Based Health Programming: A Critical Appraisal of the Literature. Université de Montréal, Annual AEESPUM Student Conference. Montreal (Canada), May 3, 2018.
15. Bigras C, D'Aquila V, **Kalubi J**, Montanaro P, & Riglea T. Navigating the depths of delirium management in the PICU: A nursing student's role in steering a family-centered approach. Nursing Research in Action: Family and Caregiving. Montréal (Canada), November 18, 2016.
16. Doucette E, Chevrier A, Bigras C, D'Aquila V, **Kalubi J**, Montanaro P, Riglea T. Navigating the Challenges of Delirium Management in the PICU: A Nursing Student's Perspective in Providing a Strengths-Based Approach. Canadian Association of Critical Care Nurses National Conference. Charlottetown (Canada), September 25-27, 2016.

## POSTER PRESENTATIONS

1. **Kalubi J**, O'Loughlin E, Riglea T, Potvin L, O'Loughlin J. Does a positive health promoting school culture differ between advantaged, moderately advantaged and disadvantaged elementary schools? 24<sup>th</sup> International Union for Health Promotion and Education World Conference on Health Promotion. Montreal (Canada), May 15-19, 2022.
2. **Kalubi J**, Pérez EJ, Riva M, Sylvestre MP, O'Loughlin J, Roncarolo F, Mercille G, Potvin L. Social inequalities in food insecurity among first-time food bank users. 24<sup>th</sup> International

Union for Health Promotion and Education World Conference on Health Promotion. Montreal (Canada), May 15-19, 2022.

3. Collonaz M, Riglea T, **Kalubi J**, O'Loughlin J, Naud A, Kestens Y, Agrinier N, Minary L. A systematic review on the use of social network analysis to study health behaviours in adolescent populations. 24th International Union for Health Promotion and Education World Conference on Health Promotion. Montreal (Canada), May 15-19, 2022.
4. Riglea T, **Kalubi J**, O'Loughlin E, Pelekanakis A, Maximova K, O'Loughlin J. Factors associated with the sustainability and institutionalization of health-promoting interventions in Québec elementary schools. 24<sup>th</sup> International Union for Health Promotion and Education World Conference on Health Promotion. Montreal (Canada), May 15-19, 2022.
5. **Kalubi J**, O'Loughlin E, Riglea T, Pelekanakis A, O'Loughlin J. Facteurs liés au succès perçu des interventions de promotion de la santé dans les écoles primaires. 24<sup>es</sup> Journées annuelles de santé publique, Institut national de santé publique du Québec. Montréal (Canada), November 23-25, 2021.
6. **Kalubi J**, O'Loughlin E, Riglea T, Potvin L, O'Loughlin J. Développement d'échelles de mesure de la culture scolaire. Congrès scientifique annuel du Centre de recherche en santé publique. Montréal (Canada) [online]. October 13-14, 2021.
7. Riglea T, Dutczak H, Hanusaik N, **Kalubi J**, Sylvestre MP, Datta G, Comeau L, Montreuil A, O'Loughlin J. Les disparités sociales dans la disponibilité des interventions de promotion de la santé dans les écoles publiques du Québec. 22<sup>es</sup> Journées annuelles de santé publique, Institut national de santé publique du Québec. Montréal (Canada), December 4-5, 2018.
8. **Kalubi J**, Lu S, Menetrier C, Mercier R, Montanaro P, Mwanza M, Rozintseva K, Fillion F. Podiatric health workshop for the homeless: Empowering vulnerable populations using the Population Health Promotion Model (PHPM) framework. Canadian Bioethics Society Annual Conference. Montréal (Canada), May 24-26, 2017.

## **OTHER PRESENTATIONS & TALKS**

1. **Kalubi J**, Dabravolskaj J. Implementation Science and Epidemiology. CELPHIE Team Meeting. Montréal (Canada), May 20, 2022.
2. **Kalubi J**. Public Health in Nunavik (Interactive workshop for high school students). École secondaire Lucille-Teasdale. Brossard (Canada), March 15 & 21, 2022.
3. **Kalubi J**, Riglea T. Prevalence of Vaping and Smoking in Adolescents: Discussion of the Hammond BMJ Paper. CELPHIE Team Meeting. Montréal (Canada), June 18, 2021.
4. **Kalubi J**. Unusual Jobs: What is public health? (Interactive workshop for high school students). École secondaire Saint-Jean-Baptiste. Longueuil (Canada), May 6 & 21, 2021.
5. Manyala P, **Kalubi J**, Mbumb K, Lwamba T, Nzinga D. Comment les jeunes entrepreneurs peuvent être accompagnés pour atteindre leurs objectifs? [Webinar]. Dr. Etienne Tshisekedi Leadership Academy (DETL). September 5, 2020.

6. **Kalubi J.** Perspectives of novice nurses. Invited panelist for Healthcare in Crisis: Nurses mobilize for change! Association Québécoise des infirmières et infirmiers (AQII). Montréal (Canada), March 28, 2018.

## REVIEWING ACTIVITIES

Conferences: International Union for Health Promotion and Education (IUHPE) 24<sup>th</sup> Conference on Health Promotion; Congrès annuel 2022 du Centre de recherche en santé publique (CReSP).  
Journals: Health Promotion & Chronic Disease Prevention, Journal of School Health, Tobacco Use Insights.

## MEDIA TRAINING & COVERAGE

- 09/2022                    **S’adapter à la Covid.** Interview on the “Maîtrise ton Doc” FRQ-funded podcast hosted by Nurau (startup for mental health advocacy).  
<https://open.spotify.com/episode/6tCC9DhFoY8ZIFRDwGxQTU>
- 12/2021                    **Workshop on relations with the media and political spheres**  
“Influencer les décideur.se.s”, Acfas.
- 09/2019                    **Le Forum de la relève étudiante pour la santé au Québec (FRESQue): l’interdisciplinarité dans le feu de l’action.** Interview, Médecin de demain. <http://ww38.medecinedemain.com/articles-ponctuels/le-forum-de-la-releve-etudiante-pour-la-sante-au-quebec-fresque-linterdisciplinarite-dans-le-feu-de-laction>
- 05/2019                    **L’isolement aux cycles supérieurs est un atout... et un piège.** Work featured in an article by Forum UdeM Nouvelles.  
<https://nouvelles.umontreal.ca/article/2019/05/30/l-isolement-aux-cycles-superieurs-est-un-atout-et-un-piege/>
- 04/2017                    **Sommet du FRESQue: La relève veut préserver le caractère public du système de santé.** Interview, ProfessionSanté.  
[https://capqc.ca/sites/capqc.ca/files/uploads/pages/2017/entrevue\\_fresque\\_nicolas\\_st-onge\\_psychotherapie\\_20170425\\_0.pdf](https://capqc.ca/sites/capqc.ca/files/uploads/pages/2017/entrevue_fresque_nicolas_st-onge_psychotherapie_20170425_0.pdf)

## EXTRACURRICULAR ACTIVITIES

- 04/2022 – ...                    **Organizing committee member**  
Annual Congress, Centre de recherche en santé publique (CReSP)
- 09/2019 – ...                    **Student representative**

05/2020 – 06/2021 **Student representative**  
 Comité de révision des décisions disciplinaires concernant les étudiants, Université de Montréal  
 Conseil des études supérieures et postdoctorales, Université de Montréal

05/2019 – 05/2020 **Administrator**  
 Fédération des associations étudiantes du campus de l'Université de Montréal (FAÉCUM)

05/2019 – 05/2020 **Administrator**  
 Fonds d'investissement des cycles supérieurs de l'Université de Montréal (FICSUM)

02/2019 – 03/2019 **Student member**  
 Selection committee, candidates to the professor position in health promotion, École de santé publique de l'Université de Montréal

09/2018 – 08/2019 **Vice-President of External Affairs**  
 Association des étudiants de l'École de santé publique de l'Université de Montréal

06/2018 – 06/2019 **President**  
 Forum de la relève étudiante pour la santé au Québec (Quebec Health Professional Students Roundtable)

09/2017 – 08/2018 **Student representative**  
 Departmental Assembly & Program committee for the MSc Public Health, École de santé publique de l'Université de Montréal

01/2017 – 06/2018 **Vice-President of Institutional Affairs**  
 Forum de la relève étudiante pour la santé au Québec (Quebec Health Professional Students Roundtable)