



## Adherence to Canadian physical activity and sedentary behaviour guidelines among children 2 to 13 years of age

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### ABSTRACT

Active living is relevant for healthy child development and disease prevention. In 2011–2012 new Canadian Physical Activity and Sedentary Behaviour Guidelines were developed for children under four and 5–17 years of age. This cross-sectional study assessed children's adherence to the national guidelines, using a large sample of Alberta children ages 2–4 and 5–13 years in 2013.

The proportions of children achieving the average daily duration of physical activity and screen time recommended were determined, and child and parental predictors of non-achievement were identified. Participants were 631 parent and child dyads. Data were collected by parental reports of physical activity and screen time during weekdays, and analysed using univariate and multivariate techniques ( $p < 0.05$ ). Logistic regression models were used to examine factors associated with children's non-achievement of physical activity and screen time recommendations while adjusting for covariates.

Sixty-two percent of children aged 2–4 and 26% of children aged 5–13 did not meet physical activity time recommendations, and 64% of children aged 2–4 and 23% of children aged 5–13 exceeded the maximum screen time recommendation. Several associations between parental age and education with non-achievement were observed but associations were not consistent across age groups or behaviours. Among preschoolers, those with middle-age parents were more likely to not achieve physical activity recommendations.

Evidence of high non-achievement of the recommendations among children 2–4 years highlights the need for increased programming targeting preschool children. Further research is required to identify modifiable risk factors that may inform future health promotion efforts.

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### Introduction

Physical activity (PA) is a key component of healthy child development and prevention of disease. PA in children is associated with a decreased risk of several chronic diseases including cardiovascular disease, metabolic syndrome, osteoporosis, and also with overall improved physical, cognitive and psychosocial wellbeing (Hills et al., 2007; Lees and Hopkins, 2013; Maximova et al., 2009; Timmons et al., 2012). Research shows that PA levels are declining among children and time spent in sedentary behaviours is becoming more common (Leatherdale and Ahmed, 2011; Shields and Tremblay, 2008). Increased sedentary behaviours, and in particular screen-based sedentary behaviours (including TV, computer, and other electronic devices), have been

associated with unfavourable growth and development (Hills et al., 2007; Marshall et al., 2004). For example, increased screen time (ST) has been related to poor diet, overweight and obesity, and lower measures of psychosocial and cognitive development (Christakis, 2009; Hancox et al., 2004; LeBlanc et al., 2012).

In 2011, the Canadian Society for Exercise Psychology revised the Physical Activity and Sedentary Behaviour Guidelines for children (5–11 years of age) and youth (12–17 years of age), and in 2012 released the first ever guidelines for younger children (0–4 years of age) (Tremblay et al., 2012; Tremblay et al., 2011a; Tremblay et al., 2011b). The guidelines are evidence-informed and include recommendations for daily PA at different ages that offer substantial health benefits, and the maximum daily amount of sedentary behaviour at different ages (including ST) that reduces health risks (The Canadian Society for Exercise Physiology, 2012). PA recommendations are: for children under 1 year of age “several times a day,” for 1–4 year-olds at least 180 min/day (any intensity), and for 5–17 year-olds at least 60 min/day (moderate to vigorous intensity); ST recommendations are: for children younger than 2 years of age “not recommended,” for 2–4 year-olds

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under 1 h/day (less is better), and for 5–17 year-olds under 2 h/day (less is better) (Tremblay et al., 2012; Tremblay et al., 2011a). The guidelines were endorsed by the Canadian Paediatric Society and extensively promoted and disseminated to the public (Tremblay et al., 2014; Tremblay et al., 2011a; Tremblay et al., 2011b). The effort to raise awareness and educate the public included a strong media engagement and initiatives to work closely with a number of professional groups in different sectors such as government, education, health, and recreation (LeBlanc et al., 2015).

Despite promotion and dissemination efforts, there are limited PA and ST data to assess adherence to the guidelines. National data available from 2012–2013 indicated that 70% of preschoolers and 9% of school-aged Canadians accumulated the recommended 180 and 60 min respectively of daily PA (ParticipACTION, 2015). Levels declined since 2007–2009 for preschoolers when 84% met daily recommendations, and remained stable for school-age children when 7% met daily recommendations (Active Healthy Kids Canada, 2013; Colley et al., 2013). National data further indicated that 15% of preschool children and 24% of school-aged children limit their daily ST to less than 1 h and 2 h a day, respectively (ParticipACTION, 2015). Given the extensive efforts to promote and disseminate the most recent guidelines, an updated assessment of adherence to the guidelines among children, and a better understanding of the factors associated with non-achievement of the recommendations are needed. Parental predictors of children's non-achievement are relevant because parents have considerable influence on their children's active living behaviours (Smith et al., 2010; Trost et al., 2003). A discourse analysis of PA promotion in children (Alexander and Coveney, 2013) identified parents as key stakeholders for supporting children's meeting the recommendations. Characterisation of children who are least likely to follow PA and sedentary behaviour recommendations based on both child and parent factors may identify children at risk of negative health outcomes, and help guide targeted active living promotion activities.

The aim of this study was to determine the proportion of children 2–4 and 5–13 years of age achieving the average daily duration recommended for both PA and ST and to identify child and parental predictors of non-achievement of the updated guidelines in a large population sample from Alberta, Canada. The distinction between children 2–4 and 5–13 years of age is important because these two age groups have distinct guidelines with different recommendations, and have different correlates associated with PA and sedentary behaviour participation (Hinkley et al., 2008; Van der Horst et al., 2007).

## Methods

### Survey

The study is a secondary analysis of the 2013 Provincial Benchmark Survey, Alberta (Pujadas Botey et al., 2014). The survey followed a cross-sectional study design. It explored both parents and non-parents' knowledge of child development and opinions about child-related issues including breastfeeding and childcare. For parents, the survey also inquired about active living, parental confidence, parental supports, and use of childcare. Participants were adults (18 years of age or older), residents of Alberta, contacted by direct dialling of residential numbers, and had interacted with a child under the age of 14 in the past six months under one of the following categories: parent (including guardians and foster parents), grandparent, other relative, through their job (e.g., childcare provider, teacher, nurse) or volunteer role. Participants were selected using a random-digit dialling approach. Only one adult living in each household dialled was eligible to participate. If more than one adult of a household was eligible, the adult who most recently celebrated his or her birthday was selected. The sample was stratified such as the first 1200 participants were equally distributed between the two large urban centres (Calgary and Edmonton, population approximately one million each) and other areas of the

province (population approximately one million) to represent the distribution of the Alberta population. Participants were selected so that approximately 25% were male, and 50% were non-parents. The total number of participants was 1451. The survey was administered weekdays and weekends, using Computer Assisted Telephone Interviewing by trained interviewers. Data were collected between March and May 2013 (Pujadas Botey et al., 2014). Ethical approval was granted by the University of Alberta Research Ethics Board.

### Participants

Participants included in the present analysis were Albertan adults who were parents of children 2–13 years old. If the parent had more than one child within the age range, he or she was asked to report on the child who most recently celebrated their birthday (Salmon and Nichols, 1983). A total of 631 parent and child dyads participated (100% of parents and their children aged 2–13 years).

### Measures

Potential child and parental factors related to PA and ST were based on demographic and other available data. Factors related to the child included: age (continuous variable, 2–13 years); gender (male, female); special needs (yes, no); in childcare (attending, not attending; children  $\leq 4$  years); and, in kindergarten or school (attending, home-schooled; children  $\leq 6$  years). Factors related to the parent included: gender (male, female); age ( $\leq 35$ , 36–41,  $\geq 42$  years); family structure (with partner, single); education level (high school or lower, technical school or some university/college, college or higher); born in Canada (yes, no); aboriginal status (yes, no); annual income ( $< \$40,000$ ,  $\$40,000$ – $\$99,999$ ,  $\geq \$100,000$ ); and residence (Calgary/Edmonton, other areas). Additional parental factors included: parenting confidence (“strongly agree”/“agree,” “neutral”/“disagree”/“strongly disagree” with “I have confidence in my parenting skills”); level of knowledge of child development ( $\geq 13$  responses correct to 26 milestone questions,  $< 13$  correct); and, emotional health (“very poor”/“poor,” “fair,” “good”/“excellent” in a 5-point scale).

To determine children's PA and ST, parents were asked to identify the approximate number of minutes per day that their child is physically active and engages screen-based behaviours on a typical weekday. Respondents were provided the definition of PA and screen-based behaviour presented in the guidelines' main dissemination products, together with age-specific examples also taken from main dissemination products. In order to account for total ST, it was clarified that both child-centred and non-intentional viewing (e.g., sitting with a parent while the parent watches an adult show) had to be considered. Responses were captured in time segments ( $< 15$  min, 15–29 min, 30–59 min, 1 h to 1 h 59 min, and 2 h to 2 h 59 min for PA;  $\leq 15$  min, 16–30 min, 31–60 min, 1 h 1 min to 2 h, 2 h 1 min to 3 h,  $> 3$  h for ST) and then categorised into “not achieving” or “achieving” times recommended based on the age of the child.

### Data analysis

Descriptive statistics were used to describe the demographics of parents and children, and to explore the number of children in each age group not meeting PA and ST recommendations. Logistic regression analysis was used to examine factors associated with children's non-achievement of the recommendations. Variables eligible for inclusion in the regression models were identified at the bivariate level if  $p < 0.2$ . Regression models were created by entering variables hierarchically. Four separate models were created for PA and ST, with children in age groups of 2–4 and 5–13 years. Significance was set at  $p < 0.05$ . Analyses were based on all available data. SPSS for Windows, version 20 was used for all analyses.

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