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## ARTICLE

### Physical activity and sedentary behaviour during after school programs.

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#### Abstract

*Background:* As Canadian children average only 14 min of moderate to vigorous physical activity (MVPA) during 3-6 pm, there is a pressing need to improve their participation in physical activities and to reduce their time spent in sedentary behaviours. Although the after school period has garnered attention as a critical period for improving children's physical activity levels and reducing time in sedentary behaviour, little is known about the effectiveness of current programming that aims to promote activity during this time. *Methods:* Two after school programs (a low-organized games and a sport-based program) were examined to determine the time participants (n=39) spent in MVPA and SB while attending these physical activity programs. *Results:* Using accelerometry, it was found that children in both programs spent more than 50% of the scheduled time in MVPA; however, the sport-based program participants obtained significantly more MVPA and significantly ( $p < 0.05$ ) less time in sedentary behaviour than the low-organized games based program participants. *Conclusions:* Existent after school programs with a physical activity focus appear to be providing significant MVPA time for participants. However, there appears to be room for improvement in time spent in SB. To more effectively encourage higher levels of MVPA and reduce sedentary behaviour in the after school time period, further research is needed to better understand the effect of program type, as well as other contributing variables on MVPA and sedentary behaviour participation. **Health & Fitness Journal of Canada 2014;7(4):3-15.**

*Keywords:* Children, youth, leisure time

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#### Introduction

Canadian data show that, on average, children aged 5-17 yr spend 14 min in moderate to vigorous physical activity (MVPA) between 3 and 6 pm daily (Active Healthy Kids Canada, 2011). Moreover, only 7% of Canadian children are meeting the recommended 60 min of daily MVPA, on six days of the week (Tremblay et al., 2011b). Additionally, Canadian children spend an average of 8.6 hr of waking time in sedentary behaviours, which is attributed in part to exceeding the recommended maximum of 2 hr per day in entertainment based-screen activities, as well as the high use of motorized transport (Colley et al., 2011; Tremblay et al., 2011a).

Adherence to international physical activity recommendations is of particular importance due to the multitude of known health benefits of physical activity, including improved cardiovascular health, insulin sensitivity, and bone mineral density, as well as reduced anxiety and improved perceived self-worth (Bailey et al., 1999; Bell et al., 2007; Ekeland et al., 2005; Goldfield et al., 2007; Kang et al., 2002; MacKelvie et al., 2001; Mark and Janssen, 2008a). Conversely, extended periods of sedentary behaviour have been shown to increase the likelihood of metabolic syndrome and hypertension, independent of time spent in MVPA (Mark and Janssen, 2008b; Pardee et al., 2007). Without a doubt, creating opportunities

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for children and youth to participate in physical activity is of the utmost importance.

Previous initiatives at promoting physical activity have primarily focused on the school day (Erwin et al., 2011; Goreley et al., 2011; Lawlor et al., 2011; Naylor et al., 2006; Sallis, et al., 1997); however, with competing outcomes in mathematics, science and language arts, placing the onus on the school day alone is impractical. Consequently, the after school time period has recently garnered attention as a “critical period” for improving children and youth’s participation in MVPA and reducing sedentary behaviour (Active Healthy Kids Canada, 2011). To date, however relatively little is known about current programming that aims to engage children in MVPA and reduce time in sedentary behaviours during the after school time period.

Two large-scale surveillance studies, the Canadian Health Measures Survey and the Nova Scotia Keeping Pace Study, have shown varying levels of MVPA participation during the 3-6 pm time period (Active Healthy Kids Canada, 2011; Colley et al., 2011; Kolen-Thompson et al., 2013). The Canadian Health Measures Survey showed children aged 5-17 yr participated in only 14 min of MVPA (8% of total time), with 59% of the total time spent in sedentary behaviours and 33% in light physical activity (Active Healthy Kids Canada, 2011). Data from the KP study showed that girls in Grade 3 spend 61.4 min (37.9% of time) engaged in light activity, 38.7 min (23.9% of time) engaged in MVPA, and 62.1 min (38.3%) in sedentary behaviour during the after school time period. Grade 3 boys were found to participate in 65.0 min of light activity

(41.2%), 38.5 min of MVPA (24.4%), and 54.3 min of the after school period engaged in sedentary behaviours (34.4%) (Kolen-Thompson et al., 2013). The discrepancy between the national and provincial data is likely due to age, as multiple research initiatives have shown reduced MVPA participation in older children (Nader et al., 2008; Thompson and Wadsworth, 2012).

While only 28% of Canadian children have access to a supervised after school program, of those with access, 81% attend a program on a regular basis (CFLRI, 2010). Additionally, parents cited physical activity as the primary focus of the majority (41%) of these programs (CFLRI, 2010). Daycare (27%), homework and tutoring (17%) or other (15%) were less frequently selected choices (CFLRI, 2010). Given the high uptake of after school programs for children with access, coupled with the understanding that many parents enroll their children in programs where the stated primary focus is physical activity (CLFRI, 2010), a better understanding of the physical activities performed at these programs is warranted.

The limited research on after school programming has shown a wide range of MVPA for the participants (Atkin et al., 2011; Sharpe et al., 2011; Trost et al., 2008; Wilson et al., 2011) with most demonstrating the potential to increase MVPA time during the 3-6 pm time period (Beets et al., 2009). Notably, Trost et al. (2008) measured MVPA participation using accelerometers at seven sites offering a non-specialized after school program to determine location and type of physical activity that resulted in the most time spent in MVPA. Program participants engaged in an average of 13.4 min in moderate physical activity and 6.9

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min in vigorous physical activity, totalling 20.3 min of MVPA during program time (Trost et al., 2008). It was noted that free-play or non-organized activities, both indoors and outdoors, accounted for the greatest contribution to MVPA (Trost et al., 2008).

More recently, two intervention studies showed the potential to improve MVPA during programming in the after school time period (Sharpe et al., 2011; Wilson et al., 2011). Active by Choice Today, aimed to improve MVPA participation for low-income and minority adolescents during and outside of program time (Wilson et al., 2011). As measured by accelerometry, a 9 min increase in MVPA was seen in the participants during the 2-hour program time at the end of the 17-week intervention; however, no changes were found in MVPA participation outside of the program (Wilson et al., 2011). The Catch Kids Club, a low-organized games based after school program, was introduced to several existing after school programs with a physical activity focus to increase MVPA participation (Sharpe et al., 2011). Many of the sites where the program was introduced were previously coordinating a general physical activity program with 6 sites utilizing a sport-based model (Sharpe et al., 2011). With the added focus on the 'Catch Kids Club' program the general physical activity programs showed little to no improvement in MVPA participation; however, for the 6 sites that transitioned to the low-organized games based model from the sport-based model, time spent in MVPA doubled, from 35.2% to 70.8% of program time (Sharpe et al., 2011). Researchers speculated that the increase found in MVPA in this program was due to the more inclusive nature of low-

organized games (Sharpe et al., 2011). Of particular note from this study was that at baseline, all three physical activity based program types examined had participants engaged in MVPA for more than 35% of program time (Sharpe et al., 2011).

The considerable increase in MVPA time noted in the Catch Kids Club intervention, coupled with the recognition that competitive sports-based programming may not be fully inclusive of all participants and may have differing objectives (e.g., increase sport specific skills) (Sharpe et al., 2011; Stratton et al., 2008), gives rise to a need to explore alternative physical activity programming offered during the after school time period. Moreover, a systematic review on after school physical activity programming showed little conclusive evidence as to what constituted an effective program or intervention with the major findings showing that single outcome interventions (e.g., those that solely focused on improving MVPA participation versus those that incorporated nutrition or other health education objectives), had the most success. Additionally, program location (e.g., at a recreation centre or at a school), did not impact the success of the intervention (Atkin et al., 2011).

To date, the existing body of research is limited and it is not clear how effective current after school care programs with a primary focus on physical activity are at engaging children in substantive periods of MVPA during the 3-6 pm time period. Additionally, as some have shown that low-organized games based programming may be more effective at engaging children in MVPA than sport-based programming (Sharpe et al., 2011), exploring programs of both types, and generating comparisons is warranted to

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better understand the merits of each. Accordingly, this study examined two physical activity focused after school programs, a sport-based model and a low-organized games-based model, to determine first, whether current programming with a physical activity focus is engaging children aged 6-10 yr in meaningful MVPA time during the after school time period, and secondly whether the two programming models differed in MVPA and sedentary behaviour time. We hypothesize that both programs will provide meaningful contributions to MVPA time and that the low-organized games program participants will engage in more MVPA and less SB time than the sport-based program participants.

### Methods

Two after school programs with a physical activity focus were selected following an internet search of after school care programs offered within the Halifax Regional Municipality. Exclusion criteria eliminated home-based care centres and programs that were not offered on all school days. This search revealed a total of 18 programs, many of which offered care at multiple sites, including the school board program, which offers care at almost all elementary schools within the municipality. The two programs compared in this study were selected as their philosophies represented a low-organized program and a sports program. Additional inclusion criteria necessitated access to indoor and outdoor space, jungle gym type equipment, a large area where children could freely run, and a variety of equipment (i.e., multiple sport balls, bats, basketball hoops and mats); in order to increase validity in the comparison between programs. Both programs

provided care for children ranging from 6-10 yr of age. A general schedule of daily activities based upon observation for each program can be found in Table 1. During structured activity time, both programs were broken into smaller sub-groups to facilitate higher levels of participation. Daily breakdown of these activities have been previously reported (Burrows et al., 2014). This study employed a non-randomized, quasi-experimental design and utilized between group comparisons. The Dalhousie Health Research Ethics Board reviewed the ethical protocol for this study. The research project was part of a larger study examining motor skill development and physical activity participation during the after school time period over a period of 11 weeks (Burrows et al., 2014). Throughout the data collection period, researchers noted that both programs utilized a “kids’ choice” system once or twice a week, with participants in both programs selecting similar or identical activities.

### Procedure

Upon providing informed consent/ assent all participants were asked to provide their birth date, and undergo a brief anthropometric assessment, measuring height and weight. Physical activity data was collected on five consecutive program days in different weeks due to time-related constraints. These weeks were selected as they were without interruption from teacher training days and statutory or school holidays. Accelerometers were distributed to participants by members of the research team, or program leaders, and collected by research assistants at the end of each program session. On- and off-times were recorded by research assistants. Tri-axial Actigraph

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accelerometers (Model: GT3X, Pensacola, FL) were used to measure time spent in sedentary behaviour, light physical activity, combined MVPA, as well as vigorous and very vigorous physical activity as separate components of MVPA. Accelerometers were worn around the waist on an elasticized belt, with the accelerometer sitting over the right hip, in line with the mid-line of the right thigh. Accelerometers were removed during pool-based activities (e.g., swimming).

### *Participants*

Prior to the beginning of the school year, a letter was sent by program administrators via email to parents of program participants informing them of the upcoming study. During the first few weeks of programming, the principal investigator coordinated information sessions at the two after school programs, and provided a letter of invitation and an informed consent/assent package to each child registered in the programs. A total of 41 participants out of a potential 135 registered program participants provided signed parental consent and child assent. As a result of personal circumstances two participants, one from each program did not attend their respective after school programs during the week of data collection.

### *Measures*

Height was measured to the nearest 0.1 cm using a portable seca stadiometer (Seca GmbH and Co., Hamburg, Germany), and weight was measured to the nearest 0.1 kg using a calibrated digital scale (Health-o-Meter Model 349KLX, Jarden Co, Rye, NY). The GT3X accelerometer was used to record physical activity data. Accelerometers are considered to be a

reliable and valid measure of intensity of physical activity (Freedson et al., 1998).

### *Data Analysis*

Accelerometer data were analyzed using ActiLife Version 6. Wear time was cropped by 2 min at the start and end to eliminate excessive movement of the device that may have occurred when placing it around the waist and removing it. Previous research has been used to establish cut-points for accelerometer counts, which correspond to activity levels from 0-1.5 METs (sedentary behaviour), 1.6-2.99 METs (light physical activity), 3.0-5.99 METs (moderate activity), 6.0-8.99 METs (vigorous activity), and >9.0 METs (very vigorous activity) (Freedson et al., 1998). Moderate activity, vigorous activity and very vigorous activity time were combined to provide an estimate of MVPA. Age-related equations were used to calculate these cut-points, as age can directly affect accelerometer counts (Freedson et al., 2005). A 5-s epoch was chosen, as previous research has established that children typically perform physical activity, particularly vigorous activity, in short spurts lasting less than 10 s (Baquet et al., 2007; Nilsson et al., 2002). As seen in Table 1, program length varied between the two programs, and as well between individual participants as participants left the program at different times dependent on when parents/guardians picked them up, thus percentage of time spent in MVPA was used for comparisons. Average minutes spent in MVPA during program time were estimated by multiplying average accelerometer wear time and average percentage of time in MVPA. Statistical analyses were done using IBM SPSS Version 20. Independent t-tests were

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**Table 1: Typical daily schedules for the games and sports programs.**

Time	Low-organized games	Sports-based program
2:30-3:00	School still in session.	School still in session for approximately half of program participants. Pick up at some schools, and walk back to program centre.
3:00-3:30	School day ends, children make their way to classrooms for snack/unstructured seated activities.	Pick up at other schools, and walk back to program centre. Unstructured free play on playground and snack time for children in attendance already.
3:30-3:45	Snack/Unstructured seated activities.	Unstructured free play on playground and snack time.
3:45-4:00	Transition to outdoor time.	Unstructured free play on playground and snack time.
4:00-5:00	Structured physical activity (15-60 min) followed by unstructured free play on playground.	Structured physical activity.
5:00-5:30	Unstructured free play on playground until pick up.	Unstructured free play on playground until pick up.
5:30-6:00	Program no longer in session.	Unstructured free play on playground until pick up.

performed to determine differences between average time spent in MVPA, light physical activity and sedentary behaviour in both programs, as well as between time spent in vigorous and very vigorous physical activity.

### Results

Demographic information for the 39 participants can be found in Table 2. No statistically significant differences were found between the two groups, with the exception of the low-organized games program participants having more female participants.

accelerometers for an average of 3.6 days out of 5 potential wear days, providing an average of  $101.9 \pm 19.8$  min·day<sup>-1</sup>. Percentage breakdowns of time spent in MVPA, light physical activity and sedentary behaviour can be found in Table 3. Participants in both programs spent more than 50% of program time in MVPA. Children in the sports program participated in significantly more MVPA than children in the low-organized games program ( $p < 0.001$ ) as can be seen in Table 3. Calculated average time in MVPA was 65.7 min per day for the sports program and 48.1 min for the low-organized games program.

**Table 2: Demographics of participants in low-organized games and sports-based programs. Mean  $\pm$  SD.**

	Males	Females	Age (yr)	Height (cm)	Weight (kg)
Low-organized games	7	15	$8 \pm 1$	$127 \pm 10$	$28.1 \pm 8.5$
Sports-based	8	9	$8 \pm 1$	$130 \pm 8$	$25.8 \pm 7.5$

Participants from the games program wore accelerometers for an average of 4.1 days out of 5 potential wear days, providing an average of  $94.9 \pm 18.8$  min·day<sup>-1</sup> worn. Participants from the sports-based program wore

There were no significant differences in time spent in vigorous or very vigorous activity between the two groups, when MVPA was broken down into components. On average, the sports program participants spent  $11.7 \pm 5.3\%$

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of program time in vigorous activity and  $1.8 \pm 2.0\%$  of program time in very vigorous activity. Participants of the low-organized game program spent on average  $8.7 \pm 5.4\%$  of program time in

that positively contributed to the daily recommendations of 60 min of MVPA. Low-organized games based program participants engaged in 48.1 min of MVPA (50.7% of time), nearly meeting the minimal daily recommendation. Sport-

**Table 3: Physical activity and sedentary behaviours between games and sports program. Mean  $\pm$  SD.**

	Games	Sports	p-value
Sedentary Behaviour (%)	38.5 $\pm$ 10.8	26.1 $\pm$ 9.1	0.001
Light Intensity Physical Activity (%)	10.8 $\pm$ 1.7	9.4 $\pm$ 1.9	0.016
MVPA (%)	50.7 $\pm$ 10.8	64.5 $\pm$ 9.0	< 0.001
Minimum MVPA (%)	32.0	42.4	
Maximum MVPA (%)	69.0	75.9	

MVPA = moderate to vigorous intensity physical activity.

vigorous activity and  $1.8 \pm 2.0\%$  of program time in very vigorous activity.

### Discussion

The aim of this study was to determine the amount of time participants spent in MVPA and SB while participating in after school programs with a physical activity focus. As well, the project aimed to compare low-organized games based programming and sport-based programming to determine if program type affected time spent in MVPA. This project is unique in that current research has focused on developing intervention studies to improve physical activity in the after school time period, without examining whether existent models are efficacious, and whether there are differences between these existent models.

#### *After school programs with a physical activity focus*

Participants in both after school programs engaged in physical activity

based program participants engaged in 65.7 min (64.5% of time), exceeding the daily recommended time by Health Canada for children and youth. This is in support of previous research conducted by Sharpe et al (2011) indicating that physical activity focused after school programs may already be providing substantial contributions to daily physical activity. In fact, participants from both programs spent greater than 50% of program time engaged in health promoting physical activity, which could be considered a potential benchmark for physical activity programming.

Our study found that children participating in an after school program with a physical activity focus engaged in more MVPA than the national average of 14 min (8% of time) during the 3-6 pm time period (Active Healthy Kids Canada, 2011). As well, participants of the current study participated in more MVPA than provincial averages of 38.5 min of MVPA (24.4% of time) and 38.7 min of MVPA (23.9% of time), for Grade 3 boys and girls, respectively (Kolen-Thompson et al.

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2013). While direct statistical comparisons cannot be made, the low-organized games and sport-based program participants spent 50.7% and 64.5% of program time in MVPA, respectively, which is more than six times that of the national average, and double that of Nova Scotian data. The extreme difference seen between the national average and the current data is likely in part due to the range of ages of children studied in the national data collection (5 to 17 yr) versus the current study (6 to 10 yr). Research has established that MVPA participation decreases with age (Nader, Bradley, Houts, McRitchie, and O'Brien, 2008; Thompson and Wadsworth, 2012). The provincial KP data, may be a better comparison, as the participants are of a similar age (8 yr) to the current study, and the large difference seen between these two data sets highlights the importance of prioritizing physical activity in after school programming. Additionally, as program participants did not necessarily spend the entire 3-6 pm time period at their respective after school program in this study, due to varying parent collection times, there is potential that these children accrued more minutes of MVPA during the after school time period than reported.

In comparison to Trost et al.'s (2008) examination of non-specialized after school programs, participants in both the sports- and low-organized games-based programs engaged in substantially more MVPA. Specifically, an average of 20.3 min·day<sup>-1</sup> of MVPA was recorded in the non-specialized programs, compared to 48.1 and 65.7 min·day<sup>-1</sup> for the low-organized games and sports programs in the current study respectively. This difference indicates a benefit to the focus on physical activity during program time,

as opposed to a general program design that incorporates some physical activity time, as substantial opportunities to engage in MVPA was provided in the two physical activity based programs studied. A number of similarities exist between the two programs examined in this study, with both programs providing opportunity to engage in MVPA in structured and unstructured settings, as well as a variety of physical activity types, potentially contributing to the high percentages of MVPA observed. Likewise both groups spent meaningful periods of time in combined vigorous and very vigorous activity, 13.5% of program time for the sports-based program participants and 10.5% of program time for the low-organized games-based program participants. While these results are in contrast to previous research initiatives, the differences may be attributed to the methodological differences associated with analyzing and reporting the physical activity data. Specifically, larger surveillance studies (Colley et al., 2011; Thompson and Wadsworth, 2012; Trost et al., 2008) used a longer epoch for physical activity data collection (30 or 60 s) in comparison to the 5 s epoch used in the current study, making direct comparisons challenging. Based on previous research that has shown that a small epoch (i.e., 5 s) has a higher sensitivity for detecting vigorous physical activity in comparison to a larger epoch (i.e., 30 or 60 s) we feel that this is an important improvement in the measurement and reporting of physical activity behaviours in children and youth (Baquet et al., 2007; Nilsson et al., 2002). Ultimately, participants of both programs spent over 10% of program time in vigorous physical activity, which we propose to be a noteworthy portion. For



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example, Hay et al. (2012) reported that 7 min of daily vigorous physical activity was associated with better health measures in children. This lends support to our recommendation that 10% of physical activity program time should be spent in vigorous physical activity, as a program of only 60 min in length would nearly meet the 7-min recommendation. As shorter epochs more accurately measure vigorous activity in children, future research initiatives examining physical activity time in children and youth should utilize 5-s epoch times in order to gain better understanding of vigorous physical activity participation.

### *Low-organized games versus sport-based programming*

Participants in the sport-based program engaged in significantly more MVPA and significantly less sedentary behaviour, than participants in the low-organized games program. Low-organized games based program participants spent more program time in light physical activity than sport-based program participants; however, this represents only a 1.46% difference in program time, therefore it is unlikely that there is any clinical relevance to this finding. The differences in MVPA and sedentary behaviour seen between the two programs are contradictory to previous research by Sharpe et al. (2011), which showed an increase in time spent in MVPA following transition to a low-organized games-based program from a sport-based model. This difference may be due to key differences between the program studied by Sharpe et al. (2011) and the current study. Particularly, the participants in the current study had specifically elected to enrol in a sport-based program, potentially due to

participant interest, whereas the participants in the study by Sharpe et al. (2011) were enrolled in a general neighbourhood program that had no specifically stated sport focus. Accordingly, a pre-existing interest in sports may have enhanced the motivation of participants of the current study to more actively engage in program activities. Additionally, Sharpe et al. (2011) introduced a change in programming to participants, which may have accounted for the increase in motivation, as new or novel programs may also enhance motivation and intensity of participation (Allender et al., 2006; Strong et al., 2005).

Other factors unrelated to after school program type may have contributed to the differences noted between the sport-based and low-organized games-based programs. For example, during the week of data collection, half of the low-organized games based program participants engaged in sedentary behaviour by watching a movie due to inclement weather, despite access to a gymnasium. Engaging in this sedentary behaviour, or other screen-based activities, creates direct competition for valuable physical activity time in a short window of program time. While the program administrators stated that screen-based activities are utilized a maximum of once per month, the results of this study provide support for the complete elimination of sedentary screen-based activities during after school programming. Additionally, the low-organized games program scheduled an extended seated snack time, which may also have contributed to the higher sedentary behaviour time, and lower MVPA time. Program administrators should consider the necessity of such

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extended periods of sedentary time, and shorten or remove mandatory seated time.

### *Limitations*

The results of this study are limited to the two after school programs studied and the individual participants from these programs that took part in the research initiative. The research study design, which employed a quasi-experimental design with limited controls, may have also impacted research results. As assignment to after school program could not be randomized, individual participants may have chosen the after school program that fit their individual preferences for physical activity participation and increased individual motivation to engage in the programming at that specific site. Additionally, individuals that elected to participate in the research project may participate in the physical activity at their after school programs more than their peers who did not volunteer. Pool-based activities were not able to be included within the analysis, and this time period was removed entirely from the analysis; therefore, overall physical activity time may have been more or less. Finally, variability between program leaders, including their ability to engage participants in activity and decisions to follow programming as set out by administrators was not controlled nor measured in the current study.

### *Recommendations/Practical Implications*

Despite these limitations, a number of specific recommendations for after school programming can be made from these results. Firstly, providing a focus on physical activity during after school program time should be a priority in

efforts to increase the physical activity levels of children between the ages of 6 to 10 yr. Both programs considered physical activity to be the main goal or purpose of the program, and both programs were successful at providing substantial MVPA participation for participants. Secondly, all sedentary screen-based activities should be removed from after school care program settings. The significant difference in time spent in MVPA and sedentary behaviour seen between the two programs may have been strongly influenced by the use of a screen activity during inclement weather. Finally, the elimination or reduction of an extended mandatory seated snack time should occur, as this time may have negatively impacted low-organized games based program participants ability to take part in MVPA.

While the results of this study are promising, further research on after school programming is warranted to examine the multiple variables that influence the success of after school physical activity interventions. Program leader training, adherence to programming and individual enjoyment of the program may all influence MVPA participation during a program, and research should continue to examine the effects of these factors in randomized studies. Continuing research in this area will help ensure the effectiveness of future programming. Additionally, access to quality after school programs, in particular those with a physical activity focus, should be considered a priority, in particular for older children and those living in rural areas, as these two populations typically have less access than younger children and those in urban areas (CFLRI, 2010). Importantly, widely available physical activity focused after

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school programs may help to improve MVPA participation in the 3-6pm time period for Canadian children.

### Conclusion

After school programming should incorporate a focus on physical activity, even if only for a portion of program time. The elimination of sedentary screen-based activities from childcare programming and a limitation on mandatory-seated snack time, may improve time spent in MVPA during after school program time. Incorporating structured indoor physical activity time should be a priority. Likewise, providing varied programming to engage the interest of program participants in order to promote continued participation in MVPA is also needed (Allender et al., 2006; Strong, et al., 2005). Future research initiatives should focus on the construction of well-controlled physical activity interventions that look at the multiple factors that influence program success including program leaders, content and individual participant characteristics in order to offer effective health promoting physical activity programming for children (Atkin et al., 2012).

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### Authors' Qualifications

The authors' qualifications are as follows: E. Jean Burrows MSc, Angela M. Kolen MSc, PhD, Melanie R. Keats, MSc, PhD.

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