

The Research File



Summary from the Canadian Fitness and Lifestyle Research Institute and ParticipACTION

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Seasonal Variations in Physical Activity



It's fun to get outside and be active on a lovely summer day, but just how much more active are we when the weather is good and how much does season affect our activity levels? Several recent articles set out to answer these questions. A recent literature review identified 37 studies

that have examined this issue and concluded that seasons and day to day fluctuations in the weather do, indeed, have an important impact on physical activity behaviours. In addition, two recent original studies reported on children's and adolescents' physical activities in relation to season and weather conditions.

Weather makes a difference

Regardless of our age, adverse weather impacts the amount of physical activity we get on a particular day. Numerous studies cited by Tucker and Gilliland demonstrate that adults and children are more active on warmer days and on days when it is not raining or snowing. Studies have also shown that adults cite season or 'bad weather' as a perceived barrier to their own physical activity and that parents have identified a reluctance to spend time outdoors in the cold to supervise their young children.

Among children aged 5-12, Duncan and colleagues noted weather influenced differences in pedometer counts: increases in temperature were related to higher weekday step counts for boys and girls and even greater weekend-day step counts for boys. While this study was undertaken in

New Zealand, the authors suggest that climates with greater day to day variations in mean temperatures would be more likely to exhibit weather related activity patterns during the week.

Bélanger and colleagues noted that, among adolescents, spontaneous unplanned activities are more greatly affected by weather than organized activities. They suggest that this likely due to the fact that organized activities are scheduled and are less likely to be cancelled.

Seasonal differences

In most studies reviewed, physical activity levels peaked in the summer months and energy expenditure decreased in winter. This seasonal decline appears to have a disturbing cumulative effect. The study of adolescents found that, over a five year period (beginning age 12-13), physical activity was lower during the winter and increased during the warmer months. However, these increases were not sufficient to return to the previous year's activity levels, resulting in a 32% reduction in the daily number of moderate or vigorous physical activity sessions over the five year period. While the magnitude of the seasonal differences diminishes



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What's happening in Canada?

Analysis of leisure time physical activity of Canadians aged 19 and over from the Canadian Community Health Survey by Merchant and colleagues reveals that physical activity is more likely if the weather is dry and moderate:

- 64% of Canadians were inactive in the winter while 49% were inactive in the summer.
- Total average daily energy expenditure was 31% higher in the summer than the winter.
- Canadians were more likely to participate in physical activity for at least 15 minutes in the summer than the winter.
- Walking was more likely in the summer than in the winter.
- Participation in any leisure time physical activity was almost twice as likely in the summer than in the winter.

The relation between season and physical activity levels was weakest in Newfoundland and Labrador and strongest in Saskatchewan and British Columbia; meaning that the differences in activity levels across seasons are greater in these western provinces and are less distinct in Newfoundland and Labrador.

over time, this reduction translates to a 7% overall decrease in physical activity every year. Adolescent's involvement in organized physical activity opportunities, whether they are held indoors or out, also appear to be lower in winter than other seasons.

Go outside and play

Time spent outdoors is highly correlated with increased physical activity levels and bad weather may keep us indoors. This is particularly true for children, whose time spent playing outdoors is highest in summer and decreases considerably during winter. While for older children, a return to school means the end of summer vacation and the related opportunity to spend time outdoors,

the effects of weather and season are noticeable among preschoolers as well.

Policy implications

In Canada, where daily and seasonal weather fluctuations are substantial, it is particularly important to offer opportunities for indoor physical activity throughout the cold and wet months of the year and active indoor alternatives on particularly cold, rainy or snowy days. Policy makers need to be aware that winter activities may be less convenient and accessible (physically and financially) than summer activities and offer options that are nearby and inexpensive in terms of both fees required investments in equipment. They also should ensure that sidewalks are maintained in every season to provide opportunities for walking year-round. In addition, promoting high profile, mass participation events similar to Canada's Fitweek, and the MOGA madness that targeted adolescents in particular, should be considered for early spring.

More Info...

Bélanger, M., Gray-Donald, K., O'Loughlin, J., Paradis, G., and Hanley J. Influence of Weather

Conditions and Season on Physical Activity in Adolescents. *Annals of Epidemiology* 2009; 19:180-186.

Duncan, JS., Hopkins, WG., Schofield, G., Duncan, EK. Effects of Weather on Pedometer-Determined Physical Activity in Children. *Medicine & Science in Sports & Exercise* 2008 Aug; 40(8): 1432-1438.

Merchant, AT., Dehghan, M., and Akhtar-Danesh, N. Seasonal Variation in Leisure-time Physical Activity Among Canadians. *Canadian Journal of Public Health*. (May-June 2007) 93:3 203-208.

Tucker, P. and Gilliland, J. The effect of season and weather on physical activity: A systematic review. *Public Health* (2007) 121, 909-922.



What have we learned?

- Consider mass communication and mass participation events in early spring to counteract the winter decline in physical activity and get Canadians, especially adolescents, moving again.
- There is a need to account for season and weather when developing physical activity interventions.
- Increasing opportunities for physical activity in the winter months may reduce the overall decline of physical activity witnessed during adolescence.
- Offer a variety of physical activity opportunities choices which appeal to members of different age groups (preschoolers to seniors) in that are tailored to season and climate.
- In winter, consider supporting participation in the broad range of sports that are featured in the Winter Olympics (cross country skiing, ice hockey, etc.)
- Provide access to both indoor activities such as swimming and gymnastics and outdoor cold weather activities such as skating and cross country skiing.
- Ensure availability of both organized and unplanned spontaneous activities.
- Consider allowing access to school facilities to parents and families to be physical activity after school hours in winter. While many schools and municipalities have formal sharing agreements, consider allowing additional use for unorganized activity (for example, that outdoor play structures and school yards are not gated and locked after hours).
- Schools and after school programs could find ways to offer active indoor opportunities on rainy, snowy or very cold days.
- Ensure appropriate attire for weather conditions.