

# Medical Student Physical Activity Education – Staying Active to Actively Help Others

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## Abstract

Exercise is Medicine Canada (EIMC) at Queen's University provided physical activity (PA) education to first year Ontario medical student conference attendees. 24 participants ( $23 \pm 2$  years) completed questionnaires one week prior (online/in-person) and one week after (online) the conference. The theory and evidence based content resulted in statistically significant increases in EIMC ( $\chi^2[1, N=24]=26.32, p<0.001$ ) and Canadian PA guideline ( $\chi^2[1, N=24]=4.00, p=0.046$ ) awareness. The presented material can be adopted in other settings to increase short-term awareness of EIMC and PA guidelines.

**Keywords:** medical school curriculum; physical activity education; Exercise is Medicine; guidelines

## Introduction

Despite population-wide efforts to promote active lifestyles ("Participation", 2016), physical activity (PA) participation remains low, with ~15% of Canadian adults meeting national guidelines (i.e. 150 minutes of moderate-to-vigorous intensity PA weekly; Colley *et al.*, 2011; Tremblay *et al.*, 2011). PA education-related content is significantly lacking in the medical school environment (Cardinal *et al.*, 2014), which may be contributing to this issue as physician PA counselling remains low (Glasgow *et al.*, 2001). Research suggests personal PA habits of medical professionals predict their counselling practices, with physically active physicians more likely to provide PA counselling (Lobelo, Duperly and Frank, 2009). Increasing PA habits of medical professionals may improve PA counselling rates and population PA levels, as research suggests patients are more likely to participate in regular PA upon receiving physician PA counselling (Elley *et al.*, 2003).

As a subset of the global movement Exercise is Medicine, Exercise is Medicine Canada (EIMC) strives to increase PA counselling habits of physicians to increase patient PA levels. The EIMC on Campus program promotes the EIMC mission at academic institutions providing opportunities for faculty, staff and students to lead PA promotion efforts on their campuses and in their surrounding communities. EIMC at Queen's University, the first Canadian on-campus chapter, was established in 2013 consisting primarily of graduate students from the School of Kinesiology and Health Studies (e.g. exercise physiology, psychology, health promotion, strength and conditioning). The group is committed to delivering professional, evidence-based initiatives to meet the needs of community partners (e.g. Queen's University School of Medicine, local Family Health Teams, etc.), and providing interdisciplinary approaches to implement PA prescription education opportunities within the medical school curriculum.

EIMC at Queen's University was invited to participate in the 2015 Ontario Medical Students' Weekend (OMSW) – "Be Well to Do Well", a provincial conference introducing first year medical students to basic clinical skills and information. EIMC at Queen's University delivered an evidence- and theory-based 40-minute workshop titled "Staying Active to Actively Help Others". The workshop discussed the importance of PA for improving health, addressed student-specific barriers to maintaining regular PA levels, and provided strategies to meet the PA guidelines. The workshop was developed using the Theory of Planned Behavior (TPB; Ajzen, 2006), as it has demonstrated utility within PA promotion workshops for health care professional trainees (Tomasone *et al.*, 2017). The TPB theorizes an individual's attitudes, subjective norms and perceived behavioral control for performing PA influences the individual's intention to increase PA levels. The workshop targeted the three constructs influencing medical students' intention to perform PA.

The purpose of the study was to assess the changes in medical students' awareness of EIMC and PA guidelines following the intervention. It was hypothesized that student awareness of EIMC and PA guidelines would increase after the workshop.

## Methods

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The study protocol was approved by the Health Sciences Research Ethics Board at Queen's University and is part of a larger data set (unpublished).

### Description of the workshop

The "Staying Active to Actively Help Others" workshop was divided into three sections targeting the PA intentions and behavior of medical students. Section 1 incorporated a 20-minute PowerPoint presentation addressing aspects of maintaining a physically active lifestyle in medical school and aimed to address the TPB constructs of attitudes, perceived behavioral control and intentions for PA engagement (Table I). First, attendees were introduced to the Canadian Society for Exercise Physiology PA guidelines for adults (Tremblay *et al.*, 2011) including the recommended amount (minutes/week) and intensity of PA, and how to assess their own PA levels. Next, attendees were educated on the efficacy of PA as an intervention for improving cardiometabolic health, independent of traditional risk factors (e.g. cigarette smoking, blood pressure, cholesterol; Blair *et al.*, 1996). Subsequently, PA barriers for medical students were addressed, and benefits of PA specific to medical students were described. Finally, to help medical students reach the PA guidelines, attendees were taught to create personal action and coping plans addressing common barriers to regular PA participation that medical students face and were provided with relevant examples. To address the TPB construct of subjective norms, Section 2 included a 10-minute pre-recorded video with three practicing physicians at different stages of their educational training and different specializations (i.e., 3<sup>rd</sup> year medical student, emergency room physician, family physician). These healthcare professionals shared

their personal challenges and successes to maintaining physically active lifestyles. Section 3 included a 10-minute practical PA component where Canadian Society for Exercise Physiology (CSEP) certified personal trainers guided participants through a warm-up and 10 resistance band exercises targeting the entire body. The importance of cool-downs after PA was also discussed. Section 3 targeted the TPB construct of perceived behavioral control. Together, the three sections provided workshop attendees with information regarding the benefits, challenges and importance of maintaining a healthy, active lifestyle throughout their medical careers.

**Table 1. Description of the "Staying Active to Actively Help Others" workshop.**

Presentation Sections	Content	TPB Construct Targeted	Delivered By	Time (min)
<b>Section 1:</b> PowerPoint Presentation	Educating on the PA guidelines	Attitudes	SKHS graduate students	20
	Discussing benefits of physical activity	Attitudes		
	Providing evidence on efficacy of PA	Attitudes		
	Outlining medical school stressors and benefits of PA	Attitudes		
	Showing current activity levels of medical students	Attitudes		
	Describing link between personal PA habits and PA counseling	Attitudes		
	Discussing barriers to PA in medical school	Perceived behavioral control		
	Creating action and coping plans for overcoming barriers to PA	Intentions		
<b>Section 2:</b> Round Table Discussion	Examples of real-life challenges and successes to maintaining PA levels in the medical profession	Subjective norms Perceived behavioral control	3 physicians (3 <sup>rd</sup> year medical student, emergency room physician, family physician)	10
<b>Section 3:</b> Practical PA	Demonstration of resistance band exercises	Perceived behavioral control	CSEP-certified Exercise Physiologists and Personal Trainers, SKHS and undergraduate/graduate students	10

Abbreviations: PA, physical activity; SKHS, School of Kinesiology and Health Studies; TPB, Theory of Planned Behavior; CSEP, Canadian Society for Exercise Physiology; min = minutes.

### Participants

Individuals were eligible to participate in the evaluation if they were in their first year of medical school in Ontario and attending the 2015 OMSW. OMSW attendees were recruited via email to participate in an online Fluid Survey questionnaire. Individuals who were interested in participating were asked to read and sign the Letter of Information/Consent before completing the questionnaires. Workshop attendees also had the option of completing the pre-questionnaire in person at the beginning of the workshop. All participants recruited for this study completed the questionnaire: 1) one week prior (online) or immediately prior to workshop commencement (hardcopy), and 2) one week after the workshop (online).

## Questionnaire measures

To test for length and item clarity, the survey was pilot tested by EIMC at Queen's University members who were not involved in questionnaire development.

### Demographics

Participants were asked general demographic information (e.g. age, gender, ethnicity, marital status, disability status), and questions regarding academic background (i.e. highest level of education completed; previous, current and anticipated future academic and medical involvement).

### PA behavior and guideline awareness

Participants were asked about their awareness of EIMC and Canadian PA guidelines (Tremblay *et al.*, 2011), including the spinal cord injury (SCI) and multiple sclerosis (MS) specific guidelines (CSEP, nd). For example, the question "Have you heard of the Canadian PA guidelines?" with response options "Yes" or "No" assessed guidelines awareness.

## Results/Analysis

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### Data analysis

Chi-square tests were used to determine changes in awareness of EIMC and Canadian PA guidelines. Statistical significance was set to  $p < 0.05$ .

### Results

Both pre- and post-questionnaires were completed by 24 first year medical students [23±2 years (16 females; 8 males)] attending the OMSW-EIMC workshop. Before the workshop, less than one-third of participants had heard of the EIMC national (29.2%) and/or campus (33.3%) initiatives and half of participants met PA guidelines (Table II). Students reported greater baseline awareness of PA guidelines for able-bodied versus individuals with disabilities (e.g., MS, SCI) (62.5% vs. 8.3%). Statistically significant increases were found for awareness of the national EIMC initiative ( $\chi^2[1,N=24]=26.32$ ,  $p<0.001$ ), and Canadian PA guidelines for adults 18-64 years ( $\chi^2[1,N=24]=4.00$ ,  $p=0.046$ ) following the workshop. Consistent with baseline trends a greater awareness for PA guidelines for able-bodied adults versus individuals with disabilities was evident post-intervention (87.5% vs. 8.3% for MS and 12.5% for SCI).

**Table 2. Participants' demographic characteristics.**

Characteristics	<i>n</i> (%) / mean ± SD
<b>Gender</b>	
Male	8 (33.3)
Female	16 (66.6)
<b>Ethnicity</b>	
Caucasian	15 (62.5)
Asian	7 (29.2)
Native Canadian	2 (8.3)
<b>Age (years)</b>	23.04 ± 1.99
<b>Sitting (hours/day)</b>	8.23 ± 2.14
<b>Walking (minutes/week)</b>	242.83 ± 154.00
<b>Moderate PA (minutes/week)</b>	58.33 ± 67.90
<b>Vigorous PA (minutes/week)</b>	93.21 ± 74.77
<b>Total Moderate-Vigorous PA (minutes/week)</b>	151.54 ± 114.16

<b>Participants who met the PA Guidelines</b>	12 (50%)
<b>Highest Level of Education Completed</b>	
University – Bachelor – Level Degree	19 (79.2)
University – Master – Level Degree	4 (16.7)
University – Doctorate – Level Degree	1 (4.2)
<b>Previous Academic Program</b>	
Life Science/Health Science	18 (75.0)
Kinesiology/Exercise Science/Physical Education	1 (4.2)
Other	5 (20.8)
<b>Medical School</b>	
Michael G. DeGroot School of Medicine (McMaster)	8 (33.3)
Queen's University	6 (25.0)
University of Toronto	7 (29.2)
Schulich School of Medicine (Western)	3 (12.5)
<b>Anticipated Area of Practice</b>	
Emergency	2 (8.4)
Family Medicine	4 (16.7)
Geriatrics	1 (4.2)
Surgery	1 (4.2)
Obstetrician	1 (4.2)
Unsure	15 (62.5)

*Note:* n=24; PA: physical activity. All values are n (%) except for age and PA are mean  $\pm$  standard deviation. Some participants declined to respond to certain questions; hence, n < 24 for walking (N = 23) and sitting (N = 22). Examples of "Other" Academic Programs include arts and science, biochemistry, biology, chemistry, economics, medical science, neuroscience, mathematics, and psychology.

## Discussion

The "Staying Active to Actively Help Others" workshop description is intended to facilitate incorporation of PA material into training of medical students. The PowerPoint presentation and video used in this workshop are available upon request from the corresponding author and their use is supported for disseminating PA information to physicians in training.

The evidence- and theory-based workshop was successful in promoting short-term awareness of EIMC and PA guidelines. With foundations in the TPB, the workshop has the potential to bolster medical students' PA cognitions. However, single event-based interventions that are successful in the short-term may not be sufficient for promoting long-term maintenance of attendees' PA-related cognitions (Tomasone *et al.*, 2017). Thus, while this intervention is beneficial and important, additional research is required to understand how to foster sustained long-term knowledge following a workshop-based intervention. The lack of baseline awareness of PA guidelines, particularly for individuals with disabilities, amongst physicians in training is an important consideration when designing future educational seminars to be incorporated into medical school training to help demonstrate the importance of exercise for all populations/patients.

Furthermore, while greater awareness of PA guidelines are important, awareness does not necessarily transfer to greater PA participation. It is important to address biopsychosocial barriers to PA participation amongst trainees (e.g. time, motivation, confidence to engage in behavior) given the variety of individual background experiences with PA (e.g. only 4% of participants in this study completed human movement degrees). If the ultimate goal is

addressing physical inactivity, transferability to physicians' personal PA behavior change will be essential for future intervention, as our findings suggest only 50% of study participants met Canadian PA guidelines. This is important, as research has demonstrated active health care providers are more likely to discuss PA participation with their patients and patients are more willing to exercise if their physicians regularly exercise (Lobelo, Duperly and Frank, 2009). Providing educational opportunities to address both physician PA and counselling behavior, such as the OMSW workshop and other EIMC at Queen's University initiatives, will help continue to integrate this vital material into the medical school curriculum. Overall, increasing awareness and PA behavior amongst physicians in training may increase physician PA counselling behaviors and potentially their patients' PA levels.

There are limitations to our study design warranting discussion. Due to the nature of the OMSW, participants self-selected to attend the "Staying Active to Actively Help Others" workshop, thus attendees may have been pre-disposed to be interested in PA prior to intervention exposure. Additionally, our sample size, although unique in involving medical students from several medical schools, was relatively small. Finally, the content delivered primarily targeted the importance of medical students' personal PA habits throughout their studies due to the workshop's time constraints. Additional investigations building upon the current study's findings should provide the evidence required to promote the implementation of mandatory PA education and prescription courses within the medical school curriculum.

## **Conclusion**

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The description and evaluation of the "Staying Active to Actively Help Others" workshop, which included content based on the TPB, provides an important starting point for addressing the lack of education regarding PA in medical students' training. This information can be used to target gaps in the current medical school curriculum so to increase awareness of PA benefits and resources amongst trainees, as well as encourage future physicians to view exercise prescription as a vital part of holistic, preventative medicine across the lifespan. The workshop increased awareness of EIMC and PA guidelines amongst first year Ontario medical students attending the 2015 OMSW. It is evident that greater awareness of the 1) EIMC initiative and 2) PA guidelines are needed amongst first year Ontario medical students. Increased awareness of EIMC, and other evidence-based PA resources and/or workshops, will support future physicians seeking to acquire knowledge about PA throughout their training. EIMC at Queen's University is committed to partnering with medical educational programs and institutions to implement the changes necessary so future and current physicians are equipped with the knowledge, tools and confidence to be active themselves and discuss PA with their patients.

## **Take Home Messages**

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- Currently there is an alarming gap in PA content provided to physicians in training.
- This is the first study to describe an evidence- and theory-based PA-promotion workshop, intending to facilitate PA material into a medical student conference.
- Increased awareness of evidence-based PA resources will support future physicians seeking to acquire PA knowledge.
- Increasing awareness and PA behavior amongst physicians in training may increase physician PA counseling behaviors and potentially their patients' PA levels.
- Local Exercise is Medicine Canada chapters could be valuable sources of support to consult when considering how to implement PA education into the medical school curriculum.

## Notes On Contributors

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Alyssa Fenuta is currently completing her doctorate studies in the Human Vascular Control Laboratory investigating nitrate supplementation's influence on oxygen delivery and exercise performance. Within the School of Kinesiology and Health Studies at Queen's University she is also involved as a teaching assistant for the Exercise, Disability and Aging Mini-stream. This undergraduate certificate specialization program is closely affiliated with the Revved Up program where she serves as a personal trainer creating adapted exercise programs for individuals with mobility impairments and intellectual disabilities.

Dr. Andrea Brennan is a current postdoctoral fellow at the Translational Research Institute for Metabolism and Diabetes where she focuses on aging, exercise, and bioenergetics using a variety of cellular, clinical, and intervention methodologies.

Rebecca Lau was most recently working on her MSc in Biomechanics, investigating how assistive devices affect walking performance.

Dr. Celina Shirazipour is a Research Scientist and Acting Assistant Professor at the Research Center for Health Equity in the Samuel Oschin Comprehensive Cancer Institute of Cedars-Sinai Medical Center. Dr. Shirazipour's area of expertise is behavioral sciences, particularly health promotion and sport and exercise psychology. The overarching goal of her research is to promote physical activity participation for individuals with illnesses and injuries resulting in impairment.

Badr Hefnawi is currently completing his final year in dentistry at McGill University, Montreal, Quebec, Canada. He is also working as a dental officer in the Canadian Armed Forces.

Katrina D'Urzo, BKin, MSc is a medical student at the Royal College of Surgeons in Ireland.

Ashley Johnson is currently a PhD candidate at Queen's University in Kingston, Ontario. Ashley is passionate about supporting communities in their health promotion efforts through her research, work and volunteer efforts. Ashley's research focuses on investigating the structures and conditions that contribute to sustainable multi-sector partnerships in community health promotion.

Iain McPhee defended his MSc at Queens in October 2016. He worked for 2 years on Parliament Hill, and is now medical student at McGill University (grad class 2022).

Brittany McEachern has obtained her Master of Science in Physical Therapy and now works as a Registered Physiotherapist at Humber River Hospital in Toronto, Ontario. She continues to be involved in knowledge translation research and is eager to incorporate research into her clinical practice.

Dr. Jennifer Tomasone's research to date has focused on knowledge translation, or closing research-to-practice gaps, for physical activity behaviour change for persons with physical disabilities and cancer.

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## Appendices

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None.

## Declarations

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*The author has declared that there are no conflicts of interest.*



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## **Ethics Statement**

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The study protocol was approved by the Health Sciences Research Ethics Board at Queen's University and is part of a larger data set (unpublished). The ROME/TRAQ approval number is 6016224.

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