

Incorporating exercise prescriptions into medical education

Exercise: the one prescription that can prevent and treat dozens of diseases.

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ABSTRACT: An exercise prescription is a critical tool that can improve patient health and prevent chronic diseases; however, substantial barriers to its use have prevented widespread adoption by physicians. A key barrier is a lack of education in the knowledge and skills required to use an exercise prescription effectively, which is perpetuated by its omission from medical education curricula. A student-led project revised the UBC Medicine curriculum to include evidence-based exercise prescription content and provide recommendations for further curriculum development, for the health of all British Columbians.

In the words of exercise medicine advocate Dr Robert Sallis, what if there was one prescription that could prevent and treat dozens of diseases? Regular physical activity is known to reduce the risk of premature death and at least 35 chronic diseases, from obesity

to dementia to depression.¹ It has also been reported that nearly 20% of adult deaths can be attributed to physical inactivity and its associated low cardiorespiratory fitness, which is more than obesity (2% to 3%), smoking (8% to 9%), diabetes (2% to 4%), and high cholesterol (2% to 4%) combined.² The positive effects on patient health of a prescription to increase physical activity cannot be denied.

Physical activity is often more effective than prescription medications for preventing and managing chronic conditions, and it improves overall patient well-being. It is also less expensive, more accessible, and results in fewer medication interactions and side effects. Despite extensive evidence supporting the benefits of physical activity, Canadians as a whole are insufficiently active to achieve these health benefits.³ With the recent publication of the groundbreaking Canadian 24-Hour Movement Guidelines for all ages (<https://csepguidelines.ca>),⁴ there has never been a better time to discuss the importance of helping patients be more active.

Patients prefer to receive advice on physical activity from physicians, and an exercise prescription is a key, effective way for physicians to encourage increased physical activity in their patients.⁵ While exercise and physical activity are not the same thing, the terms are often used interchangeably, and emphasis should be placed on whichever is more accessible for the patient. Despite the importance of an exercise prescription (ExRx), very little curricular time is currently dedicated to educating medical students worldwide on its effective

use for long-term patient well-being.^{6,7} This significant gap results in new physicians not being equipped to leverage this key element of preventive medicine for optimal patient health, a concern identified by the Association of Faculties of Medicine of Canada.⁸ With the economic burden of physical inactivity on the Canadian health care system most recently estimated at \$10 billion annually,⁹ we can no longer ignore the health, professional, or financial consequences of neglecting the ExRx in medical curricula.

Current challenges

Providing an ExRx involves first determining a patient's baseline physical activity levels using the Physical Activity Vital Sign,¹⁰ followed by providing informed advice and direction for safe and appropriate exercise in the same manner as any pharmaceutical prescription. This includes a specific therapy (goal intensity and/or activity), dose (number of minutes at a given intensity), and dosing interval (frequency per day or week). For example, a physician may explain and provide a written prescription [Figure] outlining the following to a hypertensive patient who is currently inactive:

"I'd like to help you improve your cardiovascular fitness to better manage your hypertension. Between now and our next appointment in 1 month, your exercise prescription will be to walk for 20 to 30 minutes, at least 5 days per week. Start with 10 minutes, and once that feels manageable, increase to 20, then 30 minutes per day. Your pace should be a moderate one, where your heart rate and breathing are increased but

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you can still talk normally. I'd also recommend some gentle stretching daily, especially to get you moving at work. In addition to improving your blood pressure, you may also find that this helps to reduce your stress and improve your mood. We'll follow up on how this is going at your next appointment."

When prescribed by physicians, an ExRx promotes increased physical activity and its concomitant health benefits for patients.^{11,12} However, few Canadian physicians use an ExRx to help patients prevent or manage their chronic medical conditions,^{13,14} demonstrating the significant impact of the many barriers to

implementing the ExRx.¹⁵ In a systematic review of primary care providers' perceptions of the ExRx in their practices,¹⁵ the most common barrier identified was a lack of time to dedicate to the process of providing an ExRx. A lack of knowledge or training in ExRx was the second-most common barrier cited, followed by the perception that patients are unlikely to change their behaviors even if provided with a personalized ExRx, and the physician's lack of confidence in their ability to use it.^{15,16} Addressing this lack of confidence is critical to physicians overcoming other barriers and integrating the ExRx into their practice.¹⁶

Education is a logical solution to increase physician confidence in the use of the ExRx. CME workshops and courses have been reported to improve physician knowledge and likelihood of using the ExRx when opportunities are available.¹⁶ Furthermore, these opportunities reduce the negative impact of the other identified barriers.¹⁶

Exercise prescriptions in medical education

An absence of ExRx content has been consistently reported in US⁶ and UK⁷ medical curricula. Where it is included, it is often

Exercise Prescription & Referral

Name _____

Date _____ Age _____

Relevant diagnoses _____

REDUCE SEDENTARY BEHAVIOUR

Move more / Sit less / Use stairs / Limit screen time

PHYSICAL ACTIVITY RECOMMENDATIONS

AEROBIC / CARDIOVASCULAR ACTIVITY

Frequency	1	2	3	4	5	6	7	days / week
Intensity	Light		Moderate			Vigorous		
Time	10	15	20	30	40	more	minutes / session	
Type								

STRENGTH / RESISTANCE ACTIVITY

Frequency	1	2	3	4	5	6	7	days / week
Type (e.g., yoga, freeweights)								

CANADIAN PHYSICAL ACTIVITY GUIDELINES FOR ADULTS 18 YEARS AND OLDER
 To achieve health benefits, adults aged 18 years and older should accumulate at least 150 minutes of moderate- to vigorous-intensity aerobic physical activity per week, in bouts of 10 minutes or more. It is also beneficial to add muscle and bone strengthening activities using major muscle groups, at least 2 days per week. More physical activity provides greater health benefits.

REFERRAL FOR ADDITIONAL EXERCISE ASSESSMENT AND COUNSELLING

Name / Organization _____

Reason for Referral _____

YOUR HEALTH PROFESSIONAL

Name	Signature	Licence #
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WHAT DO WE KNOW ABOUT EXERCISE?

- **Physical activity will make you feel good and can be fun!**
- **Exercise is effective.** If exercise was a drug, it would be one of the most effective and safe ways to prevent and treat many chronic diseases such as heart disease, hypertension, diabetes, osteoporosis, anxiety disorders and depression!
- **Exercise is safe for your joints.** Regular low impact exercise and gradual muscle strengthening can stabilise and protect your joints from osteoarthritis and reduce the risk of falls and injuries that is associated with poor physical fitness.
- **Improving fitness is more important than losing weight.** Low cardiovascular fitness is associated with a much higher risk of disease and death than being overweight.
- **Walking is free anywhere and any day of the year!**

WHAT ABOUT AEROBIC INTENSITY AND MUSCLE STRENGTHENING?

How can I assess intensity?

- **Light exercise will usually not cause adults to sweat and breathe harder.** It is easy to have a conversation at this intensity. Walking is the typical example of light exercise.
- **Moderate-intensity exercise will cause adults to sweat a little and breathe harder.** It is possible to have a conversation in short sentences. Examples are brisk walking (as if you are late for the bus!) and bike riding.
- **Vigorous-intensity exercise will cause adults to sweat and be "out of breath".** It is difficult to have a conversation. Examples are jogging, swimming laps, cross-country skiing and hiking on hills.

What is strength and resistance exercise?

- Strength and resistance exercises make your muscles work harder by adding weight or resistance to the movement. It is recommended to have at least one day of rest from this activity per week.

For more information

You can consult your health professional, an exercise professional or visit the Resources page on exerciseismedicine.org/canada.

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FIGURE. Adapted from the Exercise Prescription and Referral Tool.²³ Available from www.exerciseismedicine.org/canada. Copyright Exercise is Medicine Canada, reproduced with permission.

extracurricular, elective, or fails to cover all necessary topics and skills.⁶ There has yet to be a similar survey of Canadian medical curricula, but UBC Faculty of Medicine students have identified themselves as insufficiently prepared to use the ExRx despite feeling it is relevant to their future practices.¹⁷ The Canadian Academy of Sport and Exercise Medicine,¹⁸ the College of Family Physicians of Canada,¹⁹ and the Canadian Medical Association²⁰ have all formally recognized the importance of the ExRx to the health of Canadians and emphasized the need for it to be included in Canadian medical curricula.

Several best practice suggestions have been made for what an ExRx curriculum should contain and how it could be implemented. The Exercise is Medicine Education Committee (a partnership of Exercise is Medicine and the American College of Sports Medicine) defines four focus areas in their recommendations for the knowledge and skills medical students should have obtained by the end of their training:²¹

- Physical activity and fitness assessment
- Exercise prescription, implementation, and ongoing support
- Exercise counseling and behavioral strategies
- Personal physician health

A 2014 systematic review of the outcomes of physical activity prescription curricula in medical schools identified student personal physical activity behaviors, a strong conceptual base, didactic and experiential learning, and integration into other topics as key elements of an effective ExRx curriculum.²² Integration into other topics is particularly important for student learning and is also an effective way to overcome some of the recognized challenges to inclusion of the ExRx in medical curricula. These include limited availability of curricular time and funding, and a zero-sum paradigm, where the perception is that something must be removed to make room for the ExRx.⁶

Recommendations for curriculum development

These best practices were implemented as part of a student-led initiative to develop an ExRx curriculum for the UBC Faculty of Medicine.

Curricular content included the Physical Activity Vital Sign¹⁰ assessment of patient activity levels, assessing safety to begin exercising, creating a personalized ExRx for each patient, and supporting patients to overcome barriers (with an introduction to motivational interviewing skills) or providing referrals to exercise professionals for

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ongoing support. This content was integrated into the existing curriculum, with significant support and collaboration from curriculum leadership, achieving our critical goal of not adding any curricular time and thus avoiding any conflicts with other key curricular elements. Integration was facilitated by adapting existing sessions and including ExRx content in case-based sessions on related clinical topics. This allowed students to practise their skills and to reinforce and contextualize their learning with relevant real-world scenarios. Future initiatives will include:

- Introducing the importance of physical activity as a critical determinant of health earlier in the curriculum.
- Having tutors, preceptors, and other role models with experience in ExRx involved in curriculum delivery.
- Providing students with more opportunities to refine their ExRx skills with patients.
- Emphasizing the importance of these skills as an exit competency via their inclusion in examinations.
- Placing more emphasis on supporting students' own exercise behaviors.

Conclusion

The role of regular exercise in reducing the risk of mortality and the health and economic burdens of chronic disease is well established.

Physicians are in the strongest position to enhance the health of their patients with an appropriate ExRx. To take advantage of this will require educating future physicians on how to use an ExRx effectively. With this foundation in place, we will fulfill our responsibility to respond to the priority health concerns facing British Columbians by using ExRx as part of a systemic change toward improved lifelong health and well-being. ■

Additional reading

This work was completed as part of Flexible and Enhanced Learning (FLEX) in the MD Undergraduate Program at the UBC Faculty of Medicine. For more information, visit <https://mednet.med.ubc.ca/Teaching/FLEX/Pages/default.aspx>.

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Competing interests

None declared.

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