

Position Statement

The Role of Kinesiologists and the Promotion of Physical Activity and Exercise in the Canadian Health Care System

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The position of the Canadian Council of Physical Education and Kinesiology Administrators (CCUPEKA) is that:

- managing the health of Canadians should focus more on prevention.
- exercise aimed at preventing or managing disease and injury has the potential to reduce health care costs by billions of dollars annually.
- the Kinesiologist is an exercise expert trained to prescribe exercise as a preventative and rehabilitative intervention against disease and injury.
- the Kinesiologist plays an integral role within the interprofessional health care/promotion team.
- provinces should recognize Kinesiologists in legislation as regulated health professionals, and by so doing acknowledge that the specialized nature of their education and training is integral to the interprofessional health care/promotion team.
- relevant metrics be developed to demonstrate the long-term health and economic benefits of integrating Kinesiologists in the Health Care system.

EXECUTIVE SUMMARY

The Canadian Council of Physical Education and Kinesiology Administrators (CCUPEKA) commissioned this position statement to review the role of physical activity or exercise as a preventative and rehabilitative intervention to manage disease and injury and as a cost saving measure to the health care system. Physical inactivity is a modifiable risk factor known to contribute to at least 25 chronic health conditions, including diabetes, heart disease, stroke and some cancers (publichealth.gc.ca, 2012). The direct costs of treating conditions associated with physical inactivity was estimated to be more than \$2.4 billion in 2009, which represents 3.7 per cent of all health care costs that year (Janssen, APNM 2012).

Kinesiology is an evolving term to describe a multi-disciplinary academic discipline that spans the biophysical, socio-cultural, psychological, and neuromotor control aspects of human movement and performance. The discipline includes knowledge generation through research and translation of that knowledge into practice by professionals who work with a broad spectrum of populations --- from those who are physically inactive due to choice or injury or disease, through to those who are high performance athletes or who have physically demanding occupations.

The term Kinesiologist has been adopted in the province of Ontario as a professional title that identifies a health profession that is regulated by provincial legislation. The Province of Ontario and the College of Kinesiologists of Ontario are the first to entrench the title of Kinesiologist and a scope of practice in a legislative act. Should other provincial jurisdictions pursue legislation, nationally established minimum standards will be required to ensure portability of credentials (and possibly professional designation) across Canada including knowledge, applied skill sets, professional communication, and ethics and interprofessional collaboration.

University based undergraduate Kinesiology programs accredited by CCUPEKA systematically include all of the following educational courses as mandatory pre-requisites for successful completion of the degree: human anatomy, human physiology, exercise physiology, biomechanics, motor learning/motor control; psychology of physical activity, and two courses in social science and/or humanities area involving human movement as core courses and also meet CCUPEKA accreditation standards. Programs may also include

courses dealing with physical activity and aging, chronic disease, and injury prevention and care.

Universities that are CCUPEKA institutional members are a key national group with influence on recruitment, education, and research in the field of Kinesiology and are prepared to consult and advocate on behalf of the discipline. For more information on CCUPEKA, member institutions and program accreditation requirements, please refer to our website at: ccupeka.ca

Fact Box: Exercise is like Medication

Dispensing exercise should be considered in the same terms as dispensing medication



Type:	Strength, endurance, flexibility, functionally specific such as agility, balance, coordination etc.
Dosage:	Intensity of exercise
Frequency:	Sessions per day or week
Prescribed by:	A Kinesiologist



INTRODUCTION

The Canadian Council of Physical Education and Kinesiology Administrators (CCUPEKA) is a national organization of senior academic administrative leaders of university physical education and kinesiology academic programs in Canada.

THE PURPOSE OF CCUPEKA IS THREEFOLD:

1. To serve as a forum for discussion among university kinesiology and physical education administrators in Canada;
2. To serve as an accrediting body for physical education and kinesiology programs at Canadian universities; and
3. To provide a voice for Canadian academics on issues of importance to our fields of study, which is accomplished through our lobbying initiatives.

Kinesiology is an evolving term to describe a multi-disciplinary academic discipline that spans the biophysical, socio-cultural, psychological, and neuromotor control aspects of human movement and performance. The discipline includes knowledge generation through research and translation of that knowledge into practice by professionals who work with a broad spectrum of populations from those who are physically inactive due to choice or injury or disease, through to those who are performance athletes or who have physically demanding occupations.

This position paper is focused on that part of the kinesiology spectrum that involves engagement in the Canadian Health Care System, and the benefits for that system that we strongly believe are associated with the integration of Kinesiologists into that system. Specifically, this paper is intended to increase public awareness and recognition that those individuals who specialize in Kinesiology should be included as professionals with the specialized education and skills that need to be employed within the health care system in both preventative and rehabilitative roles.

KINESIOLOGY AS AN EMERGING HEALTH CARE PROFESSION

Although the University of Waterloo was the first Canadian university to establish a department of Kinesiology in 1967, the term kinesiology has only recently permeated into the public domain. Historically, most university programs were focused on preparing teachers to teach physical education in the school system. Some of the foundation sciences at the core of teacher preparation such as anatomy, physiology and biomechanics have more recently been applied to the study of human performance and human health in many other domains including high performance sport, the workplace, recreation, rehabilitation sciences, and activities of daily living. Kinesiology also focuses on the social and psychological aspects of participation in physical activity, exercise, sport and recreation. In a recent review, 23 of 38 universities in Canada incorporated the word Kinesiology in their department/faculty name or degree designation. Other Universities use derivatives of the term such as Human Kinetics, and Human Performance.

Accredited university based Kinesiology programs are the only degree granting programs whose prime focus includes all of human anatomy, human physiology, exercise physiology, biomechanics, motor learning/motor control; psychology of physical activity, and two courses in social science and/or humanities area with a focus on human movement as core courses and also meet CCUPEKA accreditation standards. Programs may also include courses dealing with physical activity and aging, chronic disease, and injury prevention and care.

Conversely, there are a number of other professional designations to describe individuals providing exercise as an intervention strategy for health promotion and management. The Canadian Society of Exercise Physiologists coined the terms certified personal trainer (CPT) and certified exercise physiologist (CEP). Warburton (2011) identified a number of professional titles used in Canada, the USA, the UK and Australia. These terms include:

- Exercise physiologist
- Clinical exercise physiologist
- Exercise specialist
- Exercise Therapist
- Cardiac rehabilitation professionals
- Pulmonary rehabilitation professionals
- Exercise Scientist
- Exercise professional
- Sport and exercise scientist
- Exercise stress personnel
- Clinical Kinesiologist

The term Kinesiologist is more and more being used across Canada to describe a new and emerging professional designation. Legislation to regulate exercise and physical activity prescription is an emerging trend in Canada. For the moment, Ontario is the only province in Canada where legislation has been passed to regulate the profession of Kinesiology but this initiative is also under way in other provinces. The College of Kinesiologists of Ontario (CKO) was officially launched in April 2013 with the specific mandate to protect the public by defining the scope of practice and associated competencies that can be expected from a Registered Kinesiologist. The link to the College of Kinesiologists of Ontario is: collegeofkinesiologists.on.ca

There are eight other provincial organizations in Canada ([see appendix 2](#)). Each provincial association will have slightly different definitions of the professional they represent. There are, however, some common threads throughout all definitions. Generally speaking, each provincial association uses the following commonalities:

What:	Study of Human Movement
How:	Physical activity and exercise prescription
Why:	Prevent, Rehabilitate, and Improve/enhance performance, health, and function
With what:	biomechanics, anatomy, and physiology

Other descriptors used by some associations include exercise psychology and neuroscience as knowledge based tools. Almost all associations referred to their role in the prevention and management of chronic disease while some associations also specified their role in the domains of sport, recreation and activities of daily living. Despite an emphasis on chronic disease, no association mentioned pathology as a knowledge based skill set. The associations from Québec and Manitoba are the only two groups that specifically state psychosocial aspects of human movement as part of their definitions. ([See appendix 1](#))



THE SCOPE OF PRACTICE OF A KINESIOLOGIST

Kinesiologists will encounter a wide range of clients from the asymptomatic (healthy) individual to those experiencing chronic diseases likely associated with a variety of co-morbidities. It is obviously the latter group that poses the greatest risk of complications from physical activity and exercise. Equally, this group could potentially derive the greatest benefit and impact on their quality of life. Warburton (2011) listed a number of competencies for professionals working with higher risk populations. A working paper prepared by the Kinesiology Coalition of Manitoba suggested that these competencies could also be applied when intervening with healthy individuals. Warburton's list of competencies was amended to read:

1. A thorough knowledge of the indications and contraindications to exercise;
2. A knowledge of effective risk factor stratification and modification as it relates to prescribing exercise to healthy or clinical populations;
3. A thorough knowledge regarding the design and implementation of safe and effective exercise prescriptions for healthy individuals;
4. A comprehensive knowledge regarding the design and implementation of safe and effective exercise prescriptions for patients with chronic disease, functional limitations, and disabilities;
5. An understanding of the effects of various co-morbidities on the response to exercise;
6. A clear understanding of the influence of commonly used medications on the response to exercise;
7. In-depth knowledge of acute and chronic responses and adaptations to exercise in healthy and clinical populations;
8. An ability to respond to emergency situations including the provision of cardiopulmonary resuscitation (CPR) and automated external defibrillation (AED) as appropriate and the ability to create and (or) respond to a written emergency plan;
9. An ability to determine when to terminate exercise testing or training;
10. A critical understanding of diagnostic stress testing protocols and procedures;
11. The ability to measure resting and exercise blood pressure accurately by auscultation, and also accurately measuring heart rate both at rest and through exercise;
12. An ability to interpret resting and exercise 12-lead ECG and rhythm strips;
13. A minimum amount of applied experience working with healthy individuals as well as patients with chronic disease, functional limitations, and disabilities;
14. Have a thorough understanding of legal and moral obligations to the client, employer and the profession.

The competency profile for the College of Kinesiologists of Ontario encompasses 45 core competencies divided into 5 major areas including Foundational Knowledge (12), Professional Practice (15), Professionalism and Ethics (8), Communication, Collaboration, and Advocacy (8) and Professional Development (2). The competency statements allow entry-level practitioners with the appropriate academic credentials (minimum undergraduate degree in the area of exercise science) to undertake the registration process. The full list of competencies is found on the CKO website at: collegeofkinesiologists.on.ca

KINESIOLOGISTS IN THE HEALTH CARE SYSTEM PREVENTION:

Physical inactivity has been implicated in at least 25 chronic health conditions, including diabetes, heart disease, stroke and some cancers (publichealth.gc.ca, 2012). Jansen reported that in 2009, more than \$2.4 billion dollars or 3.7 per cent of all health care costs were attributed to the direct costs of treating illness and disease due to physical inactivity (Jansen et al., 2012). When personal health and financial productivity due to poor health was calculated, it amounted to a loss of more than 4.3 billion dollars to the Canadian economy.

It is generally accepted that up to 80% of Canadians understand the impact of physical activity on general health and wellbeing (CFLRI, 2011). Fewer than 15% of Canadian adults meet the recommended weekly guidelines of 150 minutes of physical activity (Canadian Health Measures Survey, 2009). Sedentary behavior is also a major challenge to the health of Canadians. It is estimated that the average Canadian spends 9.5 hours (excluding sleep) being sedentary (Canadian Health Measures Survey, 2009). It is clear to see that knowledge does not translate into action. A Canadian made strategy is necessary to motivate and support Canadians as they strive for a more physically active lifestyle.

There have been many initiatives both at the federal and provincial level to promote physical activity to Canadians. Some jurisdictions have mandated physical education in schools. There have been many public education campaigns and programs. The medical community has also recognized the importance of physical activity as a means to prevent, treat and enhance health. Unfortunately the health system continues to fall short in developing a strategy that ensures a sustainable approach to the adoption of a physically active lifestyle. Primary care physicians consistently cite lack of time and lack of experience to best counsel their patients on physical activity. There is also a lack of clear and concise physical activity resources easily distributed by primary care physicians. Physicians also need assurances that exercises will be prescribed and implemented in a safe and effective manner. A multidisciplinary approach to health care that includes Kinesiologists could overcome some if not all of these limitations. To date, Kinesiologists have not been integrated in the primary health care system in Canada.

ECONOMIC IMPACT OF EXERCISE AS AN INTERVENTION:

As previously mentioned, the total costs of various conditions associated with physical inactivity is estimated to be more than \$2.4 billion Canadian in 2009, which represents 3.7 per cent of all health care costs that year (Janssen, 2012). Total costs include direct costs such as drugs and hospital care as well as indirect costs such as lost wages. Conditions that contribute to these costs include stroke, coronary artery disease, hypertension, type 2 diabetes, osteoporosis, breast cancer, and prostate cancer.

CARDIOVASCULAR DISEASE

It has been estimated that the proportion of the total cost to the Canadian health care system for stroke and coronary artery disease including hypertension, that is attributable to physical inactivity is \$4.06 billion per year (Janssen, 2012). Research strongly supports the use of physical activity and exercise-based interventions to reduce both the incidence and severity of these health conditions. Longitudinal studies have highlighted a reduced incidence of myocardial infarction, cardiovascular heart disease (CHD), and all-cause mortality for both sexes due to physical activity (Reiner et al, 2013; Petersen et al, 2012). Physically active individuals have been shown to have a lower risk of cardiovascular disease even in the presence of other risk factors such as smoking (Hamer et al, 2009). Rothenbacher et al (2006) concluded that CHD risk could be significantly decreased by becoming more physically active even in later adulthood, while Zheng et al (2009) stated that brisk walking 5 days a week for as little as 30 minutes resulted in a 19% reduction in CHD. Post disease emergence, aerobic exercise has been shown to increase the walking distance achieved in individuals with peripheral artery disease (Watson et al, 2008), while aerobic and circuit training style exercise for stroke survivors have resulted in improvements in walking speed and distance, as well as balance (Brazzelli et al, 2011; English et al, 2010). These improvements lead to greater confidence and a significant improvement in health-related quality of life (Davies et al, 2010). Individuals leave inpatient rehabilitation programs earlier (English et al, 2010) and there is a reduction in future hospital admissions due to heart failure (Davies et al, 2010). This expertise is being integrated in the multidisciplinary teams following an MI or other cardiac problem and the need has been recognized in the health care system for this patient group.



DIABETES

Similarly, positive patient outcomes have been realized between increased physical activity and a corresponding decrease in type 2 diabetes. Combined programs of aerobic and resistance training exercise have been shown to improve the body's insulin sensitivity, decrease blood lipid levels, reduce blood pressure, and decrease trunk adiposity (Castaneda et al., 2002; Cuff et al., 2003; Thomas et al., 2009). Further, Castaneda et al (2002) outlined how resistance-training exercise allowed 72% of the exercisers studied to reduce the dosage of prescribed diabetes medication compared to controls. Reiner et al (2013) have outlined a long-term reduction in the incidence of type 2 diabetes with the introduction of physical activity, while Orozco et al (2008) have shown that the incidence of diabetes is reduced by 37% for individuals on programs including exercise and diet. As the annual cost to the Canadian health care system of type 2 diabetes attributable to physical inactivity is \$1.35 billion (Janssen, 2012), it is advisable and highly recommended that Kinesiologists be an integral part of any diabetes intervention strategy. In fact, the Canadian Diabetes Association has endorsed the "Physical Activity and Exercise Toolkit" (Fowles et al), designed to increase physical activity in this population.

OSTEOPOROSIS AND BONE HEALTH

The role of physical inactivity in osteoporosis has been estimated to cost the Canadian health care system \$2.41 billion annually (Janssen, 2012) as older adults are at risk of fractures. With an increase in physical activity a small but significant improvement in bone mineral density and a corresponding reduction in fractures have been reported (Howe et al., 2011; Kemmler et al, 2011) as well as an overall reduction in fall frequency (Kemmler et al., 2011). Moreover, weight-bearing exercise have been shown to improve bone strength in children and adolescents by 1%-8% (Nikander et a., 2010). As this is a critical period of bone density development, physical activity has the potential to directly impact the incidence and severity of osteoporosis in later years.

CANCER

The Canadian health care system spends \$564 million annually on adult breast and colon cancer that is attributed to physical inactivity (Janssen, 2012). Research strongly supports the use of physical activity programs to manage cancer symptoms both during and after treatment. Exercise added to cancer treatment has been shown to reduce fatigue, improve capacity for activities of daily living, and enhance various health-related qualities of life (Cramp et al., 2012; Markes et al., 2009; Mishra [1] et al., 2012). Post-cancer treatment, physical activity continues to reduce fatigue and improves health-related quality of life (Mishra [1] et al., 2012; Mishra[2] et al., 2012), reduces anxiety and pain, (Mishra

[2], 2012), and improves shoulder range of motion in women with breast cancer (McNeely et al., 2010). Interestingly, physical activity interventions have contributed to higher return-to-work rates in employed patients with cancer (de Boer et al., 2011). Finally, children and adolescents that exercise have also shown improvement trends in health measures while coping with a cancer diagnosis (Braam et al., 2009).

OTHER ASPECTS OF PHYSICAL AND MENTAL HEALTH

Beyond the seven health conditions outlined by Janssen et al. (2012), physical activity and exercise have been shown to have a positive impact on various other physical conditions such as: muscle power, mobility, and mood for multiple sclerosis patients (Rietberg et al., 2011); improved muscle strength and aerobic capacity in individuals with rheumatoid arthritis (Hurkmans et al., 2009); reduced osteoarthritic knee pain at a magnitude comparable to non-steroidal anti-inflammatory drugs (Fransen et al., 2009) and overall reduced joint pain (Liu et al., 2009); and improvements in overall well-being and physical function, with reductions in pain and depression in fibromyalgia patients (Busch et al., 2008). Physical activity also improves self-esteem in children and youth (Ekeland et al., 2009), slows cognitive decline and prevents dementia in older adults (Reiner et al., 2013), and positively impacts people living with schizophrenia (Gorczynski et al., 2011). Further, exercise can be equal in effectiveness to antidepressant drugs when treating depression (Cooney et al., 2013). Although the exact costs for depression due to inactivity have not been researched in Canada, a study in the US found that the link between depression and inactivity was roughly equivalent to that between type 2 diabetes and a sedentary lifestyle (Garrett et al., 2004). Finally, research suggests that resistance training in older adults improves muscle strength, which positively impacts many activities of daily living such as ambulation, bathing, or meal preparation (Liu et al., 2009).

SUMMARY

The Kinesiologist is a health-care professional specializing in physical activity and exercise prescription to foster active living for the promotion of a healthy lifestyle and the prevention and rehabilitation of disease and injury. It will be important to brand and accurately define the scope of practice of a Kinesiologist such that it garners the recognition and trust of other allied health professionals, especially the primary care physician. Government agencies need to recognize the economic impact of physical activity and exercise as a preventative and disease management strategy within Canada's health care system. Kinesiologists need to be fully integrated in the health care/promotion team to ensure that exercise is effectively exploited as a preventative and rehabilitative intervention within the health care system.

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APPENDIX 1: SCOPE OF PRACTICE STATEMENTS FOR THE KINESIOLOGIST AND EXERCISE PHYSIOLOGIST

Province	Organization	Practice statement
Alberta	Alberta Kinesiology Association	<i>"Kinesiologists provide services through the application of the science of human movement and deliver quality solutions through prevention, objective assessment, and evidence based intervention."</i>
British Columbia	British Columbia Kinesiology Association	<i>"Kinesiologists conduct fitness and human movement tests and assessments. They design and implement programs to maintain, rehabilitate or enhance movement and performance in the areas of sports, recreation, work and exercise."</i>
Manitoba	Transitional Council of the College of Kinesiologists of Manitoba	<i>"Kinesiologists promote and provide best practices in prevention, assessment and intervention to enhance and maintain fitness, health and wellness, performance, and function, in the areas of sport, recreation, work, exercise, and activities of daily living."</i>
Newfoundland and Labrador	Newfoundland and Labrador Kinesiology Association	<i>"The practice of Kinesiology is the assessment of movement, performance and function and the rehabilitation, prevention and management of disorders to maintain, rehabilitate, and enhance movement, performance and function, in the areas of sport, recreation, work and exercise."</i>
Ontario	College of Kinesiologists of Ontario	<i>"The assessment of human movement and performance and its rehabilitation and management to maintain, rehabilitate or enhance movement and performance."</i>
Ontario	Ontario Kinesiology Association	<i>"Kinesiologists are committed to enhancing quality of life through the promotion of physical activity and workplace health and safety, the prevention and management of injury and chronic disease, and the over all improvement of health and performance."</i>
Québec	Fédération des kinésiologues du Québec	<i>"Le kinésiologue évalue la dynamique du mouvement humain, et ses déterminants, d'une personne présentant ou non des facteurs personnels perturbés s'étalant de la dimension fonctionnelle à la haute performance selon des fondements biopsychosociaux. Il établit un plan d'intervention et en assure sa réalisation afin d'obtenir un rendement fonctionnel optimal incluant ses capacités d'adaptation/réadaptation dans une perspective de santé globale et l'acquisition de saines habitudes de vie durable."</i>
The following provinces currently have Chapters of the CKA:		
Saskatchewan, Manitoba, Prince Edward Island, Nova Scotia, Yukon, Northwest Territories, Nunavut	Canadian Kinesiology Alliance	<i>Organization advocates for the profession of Kinesiology in the areas of health promotion, clinical rehabilitation, ergonomics, health and safety, disability and case management.</i>
All provinces	Canadian Society for Exercise Physiology	<i>"A CSEP-CEP* performs assessments, prescribes conditioning exercise, as well as exercise supervision, counselling and healthy lifestyle education in apparently healthy individuals and/or populations with medical conditions, functional limitations or disabilities associated with musculoskeletal, cardiopulmonary, metabolic, neuromuscular, and ageing conditions. *Certified Exercise Physiologist</i>
Kinesiology Act 2007	Government of Ontario Ontario Regulation 401/12	<i>"The assessment of human movement and performance and its rehabilitation and management to maintain, rehabilitate or enhance movement and performance."</i>

APPENDIX 2: LINKS TO CANADIAN PROVINCIAL KINESIOLOGY ASSOCIATIONS:

Newfoundland & Labrador Kinesiology Association: nlka.ca
 New Brunswick Kinesiology Association: no website available
 Kinesiology Association of Nova Scotia: no website available
 Federation des Kinesiologues du Quebec: kinesiologue.com
 College of Kinesiologists of Ontario: collegeofkinesiologists.on.ca
 Ontario Kinesiology Association: oka.on.ca
 Manitoba Kinesiologists Association: manitobakinesiologists.ca
 Saskatchewan Kinesiology and Exercise Science Association: skesa.ca
 Alberta Kinesiology Association: albertakinesiology.ca
 British Columbia Association of Kinesiologists: bcak.bc.ca