Physical inactivity is a fast-growing public-health problem associated with a high burden of non-communicable chronic diseases (NCDs), the leading cause of mortality and morbidity globally. It is estimated that physical inactivity is responsible for 6% of coronary heart disease, 7% of type 2 diabetes, 10% of breast and colon cancer, and 9% of premature mortality globally. It is responsible for an estimated 1.5 to 3% of direct healthcare costs in industrialised countries and was recently estimated to account for 10% of the aggregate healthcare expenditure in the USA or approximately US$110 billion dollars per year.

Improving and maintaining recommended levels of health-enhancing physical activity (at least 150 minutes of moderate-to-vigorous physical activity per week) leads to reductions in the metabolic, haemodynamic, body composition and epigenetic risk factors that heavily contribute to the development of many NCDs. As such, physical activity plays a significant role in many cases comparable or superior to drug interventions — in the prevention and treatment of more than 40 diseases such as obesity, heart disease, diabetes, hypertension, cancer, depression, anxiety, arthritis and osteoporosis.

While a plethora of research and public-health initiatives strongly recommend physical activity for preventing NCDs, population levels of physical activity remain suboptimal, with at least one-third of the global population reporting they do not meet physical activity recommendations. Given the high prevalence of NCDs and the growing health and economic burden of these diseases, promotion of physical activity has been identified as a top-priority strategy in global efforts to control the NCD epidemic.

Substantial international evidence supports the effectiveness of physical activity in the prevention and treatment of NCDs. This includes a range of chronic conditions such as heart disease, diabetes, obesity, arthritis, and osteoporosis. Physical activity can help to reduce the risk of these conditions and improve overall health and quality of life. The American College of Sports Medicine (ACSM) recommends that adults engage in regular physical activity to maintain health and prevent disease.

A LEADERSHIP ROLE FOR THE SPORTS MEDICINE PHYSICIAN TO IMPLEMENT EXERCISE AS MEDICINE FOR POPULATION HEALTH

Written by Felipe Lobelo, USA
activity counselling in healthcare settings as a strategy to be included in national physical activity promotion plans. However, barriers at multiple levels hinder the implementation of physical activity counselling, and a 'systems-change' approach is considered necessary to spark the vital institutional and personal motivation required for healthcare systems and healthcare providers to break the barriers that impede its integration into routine care. This article argues that sports medicine physicians can play a critical role in helping institutionalise exercise and physical activity prescription as a standard of care for the prevention and management of NCDs and the improvement of health and well-being in the context of population-health management, globally.

THE EXERCISE IS MEDICINE SOLUTION: A BLUEPRINT TO INCORPORATE PHYSICAL ACTIVITY PROMOTION IN HEALTHCARE

To combat low levels of physical activity in the population, several effective approaches to increase physical activity have been developed; these range from workplace, healthcare and community-based interventions to policy and environmental strategies. However, these interventions have achieved low-to-modest physical activity improvements (0.16 to 0.68 effect sizes), leading to the conclusion that no single intervention will solve the global problem of physical inactivity. Improving physical activity in the population requires comprehensive efforts to maximise the potential benefits of setting specific interventions under a coordinated multi-level, scalable approach.

Linking multiple settings where physical activity can be promoted is critical for improving the likelihood of influencing behaviour. Substantial international evidence supports the use of multi-pronged physical activity counselling and referral strategies in particular, those linking healthcare and community-based resources. Meta-analyses and systematic reviews have demonstrated that physician counselling (OR=1.42, 95%CI=1.17 to 1.73) and exercise referral systems (RR=1.20, 95%CI=1.06 to 1.35) promote improvements in patients’ physical activity for up to 12 months. Further, linking counselling strategies with community opportunities for physical activity represents a promising path to improving the maintenance of intervention effects. Physician physical activity referrals have the potential not only to affect patient physical activity but also to create links with exercise professionals and community physical activity programmes.

The Exercise is Medicine (EIM) initiative was introduced to translate the scientific evidence for the health benefits of exercise into a practical programme to advance the implementation of evidence-based approaches and strategies to elevate the status of physical activity in primary healthcare. Specifically, EIM calls for physical activity to be considered by all healthcare providers as a vital sign in every patient visit and for patients to be counselled effectively and referred for their physical activity and health needs. EIM has grown from a concept to a global health programme, with the overarching goal of making physical activity a standard in medical care to improve population-health management, including the prevention and treatment of NCDs in healthcare systems, globally. EIM has developed a multi-sector and multi-level strategy...
that links the clinical and community settings, integrates activities in the areas of policy and surveillance, physical activity assessment and counselling/referral in clinical practice, and includes process and impact evaluations^{20,21}. While conceptually simple, the implementation of the EIM model of clinical-community links for physical activity promotion is hindered by barriers at multiple levels. For individual providers, barriers are created by inadequacy in factors such as training, self-efficacy and time, and sometimes incongruence between the provider’s personal habits and several preventive counselling practices^{24-26}. At the organisational level, barriers include insufficient health-system support and care-team coordination, low priority given to physical activity preventive care services, as well as an absence of assessment tools, clinical-decision support systems, physical activity promotion tools and materials, and a lack of links with certified community resources to deliver evidence-based physical activity programming for NCD patients^{29}. These barriers are perpetuated by fragmentation of preventive care and explain the suboptimal prevalence of physical activity counselling as reported by patients in countries that have available data such as the USA (32%)^{27}, Brazil (29%)^{28}, Australia (18%)^{29} and New Zealand (13%)^{30}

A LEADERSHIP ROLE FOR SPORTS MEDICINE PHYSICIANS IN THE GLOBAL IMPLEMENTATION OF EXERCISE AS MEDICINE

Physicians trained in sports medicine have traditionally focused on the care of individuals interested in achieving high levels of performance in exercise and sports, which constitutes a relatively small proportion of the population. The scope of practice usually includes prevention and management of exercise-related injuries, conditions that can affect exercise participation and performance for amateur and professional athletes. However, the scope of sports medicine practice differs by country. For example, sports medicine physicians have traditionally been an integral part of cardiac rehabilitation units in Germany^{31}. More recently, sports medicine programmes around the world have begun to train physicians to deliver clinical physical activity interventions for primordial, primary, secondary and tertiary prevention of disease (Figure 1). For example, sports and exercise medicine (SEM) physicians in the UK spend a period of their training in public health and advise public-health physicians on physical activity promotion^{32}. In Brazil, SEM physicians form an integral part of primary care units, and are integrated into national prevention and physical activity promotion programmes^{33}. This new scope of practice for SEM physicians includes evaluation and stratification of NCD risks and comorbidities, assessment of physical activity, health-related fitness and readiness to adopt behavioural change, and provision of individualised exercise prescriptions and referrals to community-based exercise programmes and resources. All these aspects align well with the population health management framework and the EIM model. The EIM Global Health Initiative framework relies heavily on local capacity and leadership from SEM physicians to guide national EIM taskforces. These follow a multi-sector approach to working in collaboration with leaders from several national sectors in a country to develop a plan and objectives for implementing physical activity as a standard of care in the country’s healthcare systems^{34}, for example:

• primary care sector
• specialty and scientific associations (e.g. cardiology, endocrinology, nursing, nutrition/dietetics, physical therapy)
• physical education sector
• academic institutions and government (e.g. Ministry of Health and National Public Health Institute).

As the role and scope of practice of SEM physicians evolves, there is a need for a systemic shift in the provision of physical activity preventive care counselling and interventions for all segments of the population. However, this does not mean that SEM physicians are the only or, in some cases, the most efficient personnel to deliver physical activity promotion in clinical settings. Rather, approaches that benefit from the leadership, training and guidance that SEM professionals can provide within health systems may have a greater effect.

CHAMPIONING IMPLEMENTATION OF PHYSICAL ACTIVITY AS A STANDARD OF CARE IN HEALTHCARE SYSTEMS

Given the reach and effectiveness of physical activity interventions implemented in healthcare and community settings^{35-37}, linking these settings through healthcare provider referrals presents a promising, comprehensive and multi-level approach for influencing physical activity

“due to widespread deficiencies in medical training, most primary care and specialty physicians lack the appropriate knowledge, skills and self-efficacy to effectively prescribe physical activity and exercise to patients”
at the population level if such a strategy is widely implemented by healthcare systems. Evidence supports the idea that physical activity counselling can be successfully implemented in routine clinical practice and that protocols are acceptable among providers\(^\text{34}\). Recently, a physical activity vital sign (PAVS) tool was developed and implemented in healthcare systems in the USA. PAVIS consists of two questions adapted from the USA’s Behavioural Risk Factor Surveillance System and validated to screen for physical inactivity/insufficient physical activity in clinical settings\(^\text{34}\). It has been successfully integrated in the Electronic Medical Records of the largest health-management organisation in the world – Kaiser Permanente – and has been found to promote favourable changes in physician practice and patient metabolic outcomes\(^\text{25}\). Dr Robert Sallis, a SEM physician in the Kaiser Permanente Health System, played an integral role in advocating for the importance of physical activity promotion and its implementation in clinical settings\(^\text{34}\).

Integrating physical activity counselling and referral strategies into primary care practice has been found to be cost-effective\(^\text{16-18}\). Further, physical activity counselling and referral schemes provide early return on investment due to lower healthcare utilisation and costs, and are scalable to national levels with adequate sustainability and patient adherence\(^\text{29}\). It appears that multi-component approaches can be implemented within established primary care practices and making use of existing resources. Beyond being an agent of change and always assessing, counselling and referring patients for their physical activity needs in their individual practice, SEM physicians should also play a leadership role in advocating for and guiding the implementation of physical activity as a standard of care in healthcare systems. The EIM Global Health Initiative\(^\text{19}\) (and others\(^\text{\text{15,16}}\)) have summarised and continue to update the evidence on the effectiveness and cost-effectiveness of physical activity promotion in healthcare settings. SEM physicians can use these resources for advocacy purposes. The EIM framework also provides a template and practical tools to guide the implementation of physical activity assessment, counselling and referral to community-based physical activity resources, training, certification and impact and quality evaluation\(^\text{15,16,40}\).

CHAMPIONING TRAINING FOR PRIMARY CARE PROVIDERS IN EXERCISE AS MEDICINE

Most countries have only several thousand SEM physicians, clearly an insufficient workforce to provide universal physical activity promotion to millions of patients. Therefore, efficient delivery of physical activity counselling for all physically inactive patients will not be accomplished without the active engagement and participation of general practitioners and other medical specialists in addition to allied primary healthcare providers. However, due to widespread deficiencies in medical training, most primary care and specialty physicians lack the appropriate knowledge, skills and self-efficacy to effectively prescribe physical activity and exercise to patients\(^\text{16,18}\). Despite the overwhelming scientific evidence of the health benefits of exercise and the effectiveness of physical activity promotion in clinical settings, rates of doctor exercise counselling remain low. For example, only 30% of primary care physicians in the USA report always providing physical activity counselling to their chronic-disease patients\(^\text{44,46}\), only 16% of Canadian physicians report providing written prescriptions for physical activity\(^\text{47}\) and only 4% of Australian physicians provide referrals for physical activity\(^\text{48}\).

These low rates are not surprising given the lack of basic training in physical activity and health in medical schools. For example, only 13% of 102 USA medical schools in 2002 had any curriculum (at least 1 hour in the 4-year training programme) directed on physical activity and health\(^\text{44}\). In the UK, only 56% of medical schools teach the basic recommendations for physical activity to medical students\(^\text{45}\). In addition, physically inactive physicians are less likely to provide patients with exercise counselling and are less credible role models for the adoption of healthy behaviours\(^\text{46}\).

Efforts are underway to improve the provision of physical activity training in medical schools and through continued professional medical education. In the USA and Colombia, SEM physicians have led advocacy efforts to standardise provision of physical activity training in undergraduate medical education and have implemented successful pilot projects\(^\text{15,16}\). In addition, a 1-day continued medical education workshop on EIM (assessment, risk stratification, brief counselling, prescription and referral to community physical activity resources) for primary care and specialty physicians has been successfully implemented in more than 10 Latin American countries\(^\text{46}\). To date, more than 1500 physicians around Latin America have
taken the course and 60% have obtained a certification based on pre- and post-tests. In this workshop, a SEM physician typically leads courses in tandem with a colleague from primary care or a specialty relevant to the group taking the course (e.g. cardiology, endocrinology). The workshop follows a ‘train-the-trainer’ format with the goal of educating at large proportion of primary care providers and specialists in the region46.

Under the EIM framework – and to maximise efficient use of resources and personnel – it is expected that primary care physicians will provide physical activity assessment, brief counselling and referrals for a large segment of the population that has a low-to-moderate NCD risk to ensure primordial and primary prevention (Figure 1). Specialty physicians can concentrate on physical activity promotion for patients with moderate NCD risk, in particular, for secondary prevention, while SEM physicians can manage more complicated patients (i.e. those with moderate-to-high risk factors), in particular, for secondary and tertiary prevention (Figure 1).

Innovative approaches to providing guidance on ‘exercise as medicine’ can come from sports-specific concepts and strategies typically used in the day-to-day practice of SEM physicians and team physicians, but translated and adapted for application in population-health and prevention settings. Good examples are the Football for Health strategy, developed for primordial prevention by promoting healthy lifestyles in youth by leading SEM physicians at FIFA47, and the use of recreational football as a ‘therapy’ to control blood pressure better among hypertensive patients and patients with other NCDs48.

CONCLUSION
Given the increasing burden of disease associated with physical inactivity, a call to action is being made to SEM physicians because of the pivotal role they can play in helping institutionalise physical activity prescription as a standard of medical care throughout the world. The scope of practice of SEM physicians continues to evolve from a focus on the care of athletes to also include an important role in the prevention and clinical management of NCDs via multi-disciplinary population-health management efforts. Approaches that benefit from the leadership and guidance that SEM professionals can provide within healthcare systems to advocate and incorporate physical activity as a standard of care in clinical practice and adapting the EIM model to local needs should be encouraged. In addition, implementation of training models to educate primary care and specialty physicians on the basics of physical activity for health, exercise assessment, prescription and community referrals is urgently needed. No existing group of healthcare providers is better equipped to champion these efforts globally than SEM physicians.

References
Available at www.aspetar.com/journal

Felipe Lobelo M.D., Ph.D., F.A.H.A.
Associate Professor, Hubert Department of Global Health Director, Exercise is Medicine Global Research and Collaboration Center Rollins School of Public Health, Emory University Atlanta, USA

Contact: felipelobelo@emory.edu