PHYSICAL ACTIVITY PROMOTION IN MEXICAN
HEALTHCARE SETTINGS: FROM KNOWLEDGE TO ACTION

by

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**Abstract**

The rising burden of physical inactivity among Mexican adults warrants population wide intervention strategies. The healthcare setting has been recognized as an appropriate place to implement such strategies. Although physician-delivered strategies have been shown to improve patient physical activity (PA), physician counselling, prescription and referral rates remain low. Guided by the Knowledge-to-Action framework, the purpose of this dissertation was to identify gaps in Mexican physician PA prescription practices, to identify a counselling tool for addressing this gap and to implement an intervention for improving physician counselling practices.

In study 1, the PA prescription behaviour of Mexican primary care physicians (N=633) and the psychosocial factors influencing this behaviour were explored. Findings showed that only 6% of physicians regularly prescribe PA and that their perceived ability to prescribe, as well as their own PA behaviour, explain this practice.

In study 2, the informational (e.g. signage), educational (e.g. posters) and instrumental (e.g. stairs) environments of 40 primary care clinics/hospitals in Guadalajara were assessed for their potential to promote PA. The Healthcare Environment Assessment Tool was developed to assess these environments (kappa=.81). Findings showed that the instrumental environment is encouraging, but the informational and educational environments could be improved.

In study 3, a theory-based training intervention to improve PA counselling practices among primary care physicians was developed and evaluated using the RE-AIM framework. The training strategy reached 305 primary care physicians (52% female, mean age 40 years), was effective for improving physicians’ psychosocial constructs in
the short term and PA counselling practices in the long term, was successfully adopted and consistentl

This dissertation demonstrates that knowledge translation efforts in Mexican healthcare settings are feasible and promising for promoting evidence-based PA promotion practices. This dissertation represents the first step in that direction and sheds light on potential approaches for facilitating such efforts.
Co-Authorship

The manuscripts presented in this dissertation are the work of Karla Galaviz. The co-authors included in this dissertation are Dr. Lucie Lévesque (Manuscripts 1-3), Dr. Edtna Jauregui (Manuscripts 1 and 3), Dr. Leandre Fabrigar (manuscript 1), Dr. Juan Lopez y Taylor (manuscript 1 and 3), Dr. Amy Latimer-Cheung (manuscript 1), Dr. Rebecca E. Lee (manuscripts 2 and 3), Dr. Kim Bergeron (manuscript 2), Dr. Paul Estabrooks (manuscript 3), Dr. Ian Janssen (manuscript 3) and Dr. Luis Ortiz (manuscript 3). Research was supported by a Canadian Institutes of Health Research operating grant (Lévesque) and by a CONACyT graduate scholarship for studies abroad (Galaviz).

Manuscript 1: Physical activity prescription among Mexican physicians: a structural equation analysis of the theory of planned behaviour. This manuscript is under review at the International Journal of Clinical Practice. The version presented in this dissertation adheres to journal formatting and reporting guidelines. Ms. Galaviz was responsible for: developing the research question; collaborating with the Secretary of Health to recruit physicians and to collect data across the 13 sanitary regions in the state of Jalisco; developing the research tools including recruitment materials and study questionnaire; travelling to Jalisco to coordinate research activities; collecting, entering and analyzing data; and writing the manuscript. Dr. Lévesque provided input with regards to the study design; statistical analyses; interpretation of results; and editorial feedback on the manuscript. Dr. Jauregui, provided access to the study population, coordinated recruitment and data collection, and provided editorial feedback on the manuscript. Dr. Fabrigar, Dr. Latimer-Cheung and Dr. Lopez y Taylor provided guidance with data.
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**Manuscript 2:** *The Healthcare Environment Assessment Tool (HEAT): Assessing physical activity opportunities in Mexican healthcare settings.* This manuscript is under review at the Journal of Physical Activity and Health and is presented according to the journal guidelines. Ms. Galaviz was responsible for: developing the research question; developing a sampling strategy and developing the hospital assessment tool; conducting in person visits to all clinics and hospitals selected; collecting, entering and analyzing data; and writing the manuscript. Dr. Lévesque provided input with regards to the study design; statistical analyses; interpretation of results; and editorial feedback on the manuscript. Dr. Lee and Dr. Bergeron provided input regarding the study design, assessment tool development and editorial feedback on the manuscript.

**Manuscript 3:** *Training physicians on physical activity counselling: a RE-AIM evaluation.* This manuscript will be submitted to Implementation Science. Ms. Galaviz devised the research question and study design; developed the physician training course and training materials; prepared study questionnaires and data collection tools; coordinated data collection and entry; analyzed data; and wrote the manuscript. Dr. Lévesque provided input with regards to the study design; statistical analyses; interpretation of results; and editorial feedback on the manuscript. Dr. Jauregui, provided access to the study population, recruited physicians, delivered the training course, collected data, and provided editorial feedback on the manuscript. Dr. Janssen provided input regarding the study design, data analyses, interpretation of study findings and...
provided editorial and critical feedback on the manuscript. Dr. Estabrooks, Dr. Lee, Dr. Ortiz and Dr. Lopez provided input regarding the study implementation, interpretation of study findings and provided editorial and critical feedback on the manuscript.
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List of Abbreviations

PA: Physical Activity
TPB: Theory of Planned Behaviour
KT: Knowledge Translation
KTA: Knowledge to Action
NCDs: Non-communicable diseases
FITT: Frequency, Intensity Type and Time
RE-AIM: Reach, Effectiveness, Adoption, Implementation and Maintenance
1.1 Overview and Background Information

Physical inactivity is associated with the development of major non-communicable diseases (NCDs) such as type 2 diabetes, coronary heart disease, breast cancer and colon cancer (Lee et al., 2012). Not surprisingly, physical inactivity is responsible for 6-10% of the deaths related to NCDs worldwide and is recognized as the fourth leading cause of death worldwide (WHO, 2009). A third of the global population is not meeting the physical activity recommendations of engaging in 150 minutes of moderate-to-vigorous physical activity per week (Hallal et al., 2012). Thus, physical inactivity has been recognized as a pandemic (Kohl et al., 2012) and Mexico is no exception.

Inactivity estimates among the Mexican adult population range from 17% to 38% (Gutiérrez et al., 2012; Hallal et al., 2012) and NCDs, namely cardiovascular diseases and type 2 diabetes, represent the principal causes of death in the country (Barquera et al., 2013; Cordova-Villalobos et al., 2008; Velazquez et al., 2007). Regular physical activity protects against these, and other chronic diseases (Lee et al., 2012). Further, regular physical activity can achieve parallel or greater effects on NCDs risk factors than those achieved with drugs at a lower cost and with minimal adverse effects (Fiuza-Luces, Garatachea, Berger, & Lucia, 2013). Thus, increasing physical activity at the population level has become an essential component of major global initiatives to improve health.
(WHO, 2012) and represents a promising strategy to battle the rising burden of NCDs in Mexico.

The healthcare setting has been recognized as an appropriate and promising venue for promoting physical activity (Jacobson, Strohecker, Compton, & Katz, 2005; Petrella & Lattanzio, 2002; Whitlock, Orleans, Pender, & Allan, 2002). In developing countries, where physicians hold a respected position, this setting may exert a strong influence on patients’ behaviours (Holub et al., 2013). Physical activity can be effectively promoted in healthcare settings (Meyer et al., 2010; Patrick, Pratt, & Sallis, 2009) where not only patients, but also healthcare employees can be reached (Proper & van Mechelen, 2008; Tulloch, Fortier, & Hogg, 2006). Two physical activity promotion approaches relevant to the healthcare setting are physician-delivered strategies and environment-based strategies.

Evidence from a meta-analysis shows that physician counselling can improve patient physical activity, with evidence of some changes being sustained for up to 12 months (Orrow, Kinmonth, Sanderson, & Sutton, 2012). A systematic review showed that physician physical activity prescription promotes moderate improvements on patient physical activity lasting from six to 12 months (Sørensen, Skovgaard, & Puggaard, 2006). Similarly, another systematic review showed that exercise referral schemes produce small improvements on physical activity among inactive patients (Williams, Hendry, France, Lewis, & Wilkinson, 2007). Emerging evidence supports the use of multicomponent strategies that combine counselling, prescription and referrals to achieve greater and more sustainable effects on patient physical activity (Lobelo, Garcia de Quevedo, & Martin, under review; Lobelo, Stoutenberg, & Hutber, 2014). Integrating these physician-
delivered strategies into primary care practice has been found to be feasible and cost-effective (Garrett et al., 2011; Hogg et al., 2012; Murphy et al., 2012).

Environmental physical activity strategies relevant to the healthcare setting include informational (e.g. signage, floor stickers), educational (e.g. posters, brochures, self-help materials), and instrumental (availability and quality of stairs, elevators, outdoor spaces) approaches. These strategies have been shown to promote physical activity in healthcare and other settings (Bungum, Meacham, & Truax, 2007; Crespo, Sallis, Conway, Saelens, & Frank, 2011; Kerr, Yore, Ham, & Dietz, 2004; Marcus et al., 1998; Meyer et al., 2010; Nicoll & Zimring, 2009; Olander & Eves, 2011; Plotnikoff et al., 2007). For their potential to promote physical activity, environment-based healthcare strategies have been implemented in the United States, Canada and Europe (CDC, 2012; OHPHN, 2008; WHO, 2006).

Even though a considerable evidence base exists, effective physical activity promotion strategies are not being implemented in Mexican healthcare settings. In fact, physical activity is just starting to be recognized as an important behaviour given the rising NCD burden in the country. Thus, approaches for introducing evidence-based physical activity promotion strategies in healthcare practice are needed. The knowledge-to-action (KTA) framework (Graham et al., 2006) provides a map for guiding such an endeavour. The KTA framework outlines three phases for promoting the translation of evidence into clinical practice: 1) identification of problem and selection of knowledge, 2) solution building, and 3) implementation, evaluation and sustainability of knowledge. Each of these phases outlines a specific set of actions aimed at promoting the uptake, impact and continued use of evidence in practice.
Information about the current state of physical activity promotion in Mexican healthcare settings is lacking. For instance, Mexican physicians’ physical activity counselling practices and the factors that influence these practices are unknown. Further, whether the informational, educational and instrumental environments of Mexican healthcare settings are promoting physical activity is unknown. Consequently, interventions that can address existing gaps in healthcare practice have not been developed. The KTA framework can help address these questions and guide the development of approaches to improve physical activity promotion practices in Mexican healthcare settings.

1.2 Objective of the Dissertation

Following the KTA framework, the aim of this dissertation was to: 1) identify gaps in physical activity prescription practices among Mexican primary care physicians and to identify the factors influencing these practices, 2) assess the informational, educational and instrumental environments in Mexican healthcare settings for their potential to promote physical activity, and 3) design, implement and evaluate a training intervention for improving the use of evidence-based physical activity counselling practices among primary care physicians. From this work, the applicability of the KTA framework within the context of a middle-income country and the feasibility and effectiveness of an evidence-based, theory-driven physician training strategy were examined.
1.3 Overview of the Dissertation

This dissertation is structured in manuscript format and includes a literature review, three manuscripts and a general discussion. All studies were conducted in primary care clinics and hospitals located in Jalisco, Mexico, in collaboration with the Jalisco Secretary of Health. The literature review comprises a review of the current literature examining strategies for promoting physical activity in healthcare settings, physician physical activity counselling practices and their correlates, as well as the knowledge translation process within healthcare settings. The first manuscript, titled “Physical activity prescription among Mexican physicians: a structural equation analysis of the theory of planned behaviour”, explores the current physical activity prescription behaviour of Mexican primary care physicians and psychosocial factors influencing these practices. To better understand the Mexican healthcare context, the second manuscript, titled “The Healthcare Environment Assessment Tool (HEAT): Assessing physical activity opportunities in Mexican healthcare settings”, examines the informational, educational and instrumental environments in Mexican healthcare settings for their potential to promote physical activity. Informed by the first and second manuscripts, a training intervention aimed at improving physicians’ use of evidence-based physical activity counselling practices was developed. The third manuscript, titled “Training physicians on physical activity counselling: a RE-AIM evaluation”, presents findings from an evaluation of the physician training intervention. The three manuscripts are followed by a general discussion, which includes a summary of key findings; strengths and limitations of the work; implications of findings; directions for future research; and a conclusion.
1.4 References


Chapter 2

Literature Review

2.1 Health Implications of Physical Inactivity-Activity

Physical inactivity is the fourth leading cause of death worldwide (WHO, 2009). Physical inactivity is associated with the development of major non-communicable diseases (NCDs) such as type 2 diabetes, coronary heart disease, breast cancer and colon cancer (Lee et al., 2012). This is alarming given that 31% of the world’s population is not meeting the international physical activity recommendations (Hallal et al., 2012). Not surprisingly, physical inactivity is responsible for 6-10% of the deaths related to NCDs worldwide (WHO, 2009) and exerts a substantial economical burden on healthcare systems (Pratt, Norris, Lobelo, Roux, & Wang, 2012). Given the high prevalence, health burden and healthcare costs of physical inactivity, it has been recognized as a pandemic that will particularly affect low- and middle-income countries in the years to come (Kohl et al., 2012).

Promoting physical activity at the population level represents a promising strategy to battle this pandemic. Physical activity reduces the risk for all-caused mortality by 31% (Warburton, Charlesworth, Ivey, Nettlefold, & Bredin, 2010). Specifically, regular physical activity protects against coronary heart disease, type 2 diabetes, some cancers, hypertension, obesity, clinical depression, and other chronic disorders (Lee et al., 2012). Further, regular physical activity can achieve parallel or greater effects on NCDs risk factors than those achieved with drugs at a lower cost and with minimal adverse effects (Fiuza-Luces, Garatachea, Berger, & Lucia, 2013). Thus, promoting physical activity has
become a central component of major global initiatives aimed at reducing the rising burden of NCDs (WHO, 2012).

The minimal dose of physical activity needed to achieve health benefits as outlined in the international guidelines, is 150 minutes of moderate-to-vigorous physical activity per week accumulated in bouts of 10 or more minutes (WHO, 2011a). Evidence of a dose-response relationship is overwhelming, showing that higher amounts of physical activity translate into greater health benefits (Warburton et al., 2010). Surprisingly, the greatest health benefits achieved through physical activity are those experienced by inactive individuals when they become at least lightly active (Warburton et al., 2010). Therefore, working towards promoting the inactive-to-active transition could translate into significant health benefits at a population level.

2.2 Physical Activity Promotion in Healthcare Settings

Given that NCDs are the leading cause of mortality in the world (WHO, 2011b), the healthcare paradigm is shifting from mainly focusing on the diagnosis and treatment of illness, to also focusing on the prevention and early detection of health threats (Patrick, Pratt, & Sallis, 2009). Within this preventive paradigm and with a desire to promote health benefits, physical activity becomes an essential component of the efforts implemented in healthcare settings. Attention to physical activity has increased over the past ten years and institutions in the United States and Canada have recommended the introduction of physical activity promotion strategies in healthcare settings (Jacobson, Strohecker, Compton, & Katz, 2005; Petrella & Lattanzio, 2002). The healthcare context offers resources, infrastructure and a workforce that can be used to promote physical
activity (Lobelo, Stoutenberg, & Hutber, 2014), thereby, improving the feasibility and cost of introducing such strategies.

A high proportion of the inactive population can be reached in healthcare settings, making these appropriate venues for promoting physical activity at the population level (Garrett et al., 2011; Jacobson et al., 2005; Petrella & Lattanzio, 2002). Further, patients expect and are receptive to preventive health information from their healthcare providers, making physical activity a potentially strong cue for health promotion action in healthcare (Jacobson et al., 2005). In low- to middle-income countries, where physicians hold a respected position, healthcare settings may exert a strong influence on patients’ behaviours (Holub et al., 2013). Physical activity can be effectively promoted in healthcare settings (Meyer et al., 2010; Patrick et al., 2009) where not only patients but also healthcare employees can be reached (Proper & van Mechelen, 2008; Tulloch, Fortier, & Hogg, 2006).

Two prominent approaches have been implemented to promote physical activity in healthcare settings: physician-delivered and environment-based strategies. Examples of physician-delivered strategies include the Exercise is Medicine initiative implemented in 37 countries including the United States and Canada (Lobelo et al., 2014), the Green Prescription strategy implemented in New Zealand (Swinburn, Walter, Arroll, Tilyard, & Russell, 1998) and the Exercise Referral Schemes implemented in the United Kingdom (Morgan, 2005). Environmental strategies for promoting physical activity among patients and healthcare employees are already in place, including the Health Promoting Hospitals strategy implemented in Europe and Canada (OHPHN, 2008; WHO, 2006) and the Healthy Hospital Practice to Practice Series implemented in the United States (CDC,
For their potential to impact population-level physical activity, promotion strategies have been implemented in healthcare settings around the world.

2.3 Mexico, Healthcare and Physical Activity

México, with a population of 100 million, is a middle-income country, with a high degree of social inequity and diverse and complex health problems. Mexico is also facing the public health burden of physical inactivity. Inactivity estimates among the Mexican adult population range from 17% to 38% (Gutiérrez et al., 2012; Hallal et al., 2012) and NCDs, namely cardiovascular diseases and type 2 diabetes, represent the principal causes of death in the country (Barquera et al., 2013; Cordova-Villalobos et al., 2008; Velazquez et al., 2007). The physical inactivity problem is especially complex in Mexico because the country is currently facing a double burden of disease. Mexico continues to deal with infectious diseases and under-nutrition, while dealing with the emerging challenges of NCDs in the poorest segments of the population (Arredondo, Zuniga, & Parada, 2005; Prentice, 2006). This is due to the recent epidemiological transition, where the overall causes of death shifted from infectious diseases to NCDs (Manton, 1988); the current nutrition transition (Rivera et al., 2002), where diets have shifted from indigenous foods (i.e., unrefined foods) to “industrialized” foods (i.e., high fat/high sodium/high sugar processed foods); and the physical activity transition (Katzmarzyk & Mason, 2009), where the physical demands of occupations and transportation have gone from highly active (e.g., walking to work in the fields) to sedentary (e.g., driving, working at a desk). The magnitude of the physical inactivity issue in Mexico is large enough to warrant a population wide strategy.
A promising population-level strategy to enhance the prevalence of physical activity is to promote physical activity in Mexican healthcare settings. Until recently, physical activity has not been a priority of the Mexican healthcare agenda and it has not been widely promoted by government, healthcare institutions or healthcare personnel (Bacardí-Gascón, Rosales Garay, & Jiménez-Cruz, 2005). Even though the importance of physical activity for the prevention of NCDs has been recognized, formal efforts for promoting physical activity in Mexican healthcare settings have been slow to emerge. More recently, however, two national strategies that include a physical activity component have been introduced in the Mexican healthcare context. The first is the Medical Speciality Units (UNEMES) program, where units of multidisciplinary teams specialized in the care of NCDs are formed to provide the patient with comprehensive healthcare including health education, individualized diet programs, physical activity prescriptions and pharmacological treatment when needed (Cordova-Villalobos et al., 2008). Another example is the PREVENIMSS program implemented by the National Social Security Institutes in Mexico (Muñoz-Hernández, 2006), where health education and preventive consultations are provided to patients. Although these strategies have not been formally evaluated, their continued implementation, despite a change in governments, suggests that promoting physical activity in the Mexican healthcare setting is feasible and increasingly valued.

The healthcare system in Mexico is unique and has implemented important reforms in the last ten years (Barraza, Bertozzi, Gonzlez, & Gutierrez, 2002; Frenk, Gomez, & Knaul, 2009). The Mexican healthcare system is formed by three subsystems: the National Institutes for Social Security, the Secretary of Health, and the private sector.
The insured seek healthcare within the National Institutes for Social Security (50%), while the uninsured seek healthcare within the Secretary of Health (45%) or the private sector (5%; Frenk et al., 2009). This fragmented system creates health inequities, especially among the uninsured (Barraza et al., 2002). The uninsured population is usually of lower socioeconomic status and receives little preventive care (Barraza et al., 2002). To ameliorate this, a reform was implemented in 2003, which focused on offering the uninsured population an alternative form of insurance, the Seguro Popular (Frenk et al., 2009). About 20% of the uninsured population now has this alternative insurance (Frenk et al., 2009) and has access to the preventive services offered in healthcare clinics and hospitals from the Secretary of Health.

Physical activity promotion is feasible and fits within the Mexican healthcare context. The growing interest in physical activity promotion through healthcare has translated into some programs being implemented in Mexico. However, programs directed at the uninsured population, that are evidence-based and systematically implemented and evaluated are needed.

2.4 Physical Activity Promotion in Primary Care – The Evidence

Emphasis on implementing preventive strategies that can help reduce the NCD health burden is growing mostly within the primary care level of health systems, where essential healthcare is provided for all individuals in the community. The primary care setting is considered ideal to promote physical activity because preventive care is provided there and because of the potential of this setting for improving patients’ health-related behaviours (Whitlock, Orleans, Pender, & Allan, 2002). Among healthcare
professionals, physicians have been preferred as the main contact for delivering physical activity interventions in these settings (Tulloch et al., 2006).

Physician-delivered strategies have been implemented in primary care settings around the world over the past ten years. Evidence from a meta-analysis shows that physician counselling can improve patient physical activity, with some sustainable changes for up to 12 months (Orrow, Kinmonth, Sanderson, & Sutton, 2012). A systematic review showed that physician physical activity prescription promotes moderate improvements in patient physical activity lasting from six to 12 months (Sørensen, Skovgaard, & Puggaard, 2006). Similarly, another systematic review showed that exercise referral schemes produce small improvements in physical activity among sedentary patients (Williams, Hendry, France, Lewis, & Wilkinson, 2007). Emerging evidence supports the use multi-component strategies that combine counselling, prescription and referrals to achieve greater and more sustainable effects in patient physical activity (Lobel et al., 2014).

The physical activity written prescription alone is effective for promoting physical activity initiation and represents a cost-effective strategy that outperforms other intervention strategies (Garrett et al., 2011). Similarly, physical activity counselling promotes short-term improvements in patients’ physical activity and in the proportion of inactive patients becoming active (Aittasalo, Miilunpalo, Kukkonen-Harjula, & Pasanen, 2006; Hardcastle, Taylor, Bailey, & Castle, 2008; Martins & McNeil, 2009; Petrella & Lattanzio, 2002). This effect can have a significant public health impact given that most of the physical activity health benefits are experienced when inactive people become at least lightly active (Warburton et al., 2010); physical activity counselling and prescription
interventions seem to promote this transition. Finally, referrals to community resources or counsellors can improve patient physical activity (Fortier et al., 2011; Fortier, Sweet, O’Sullivan, & Williams, 2007; Harrison, Roberts, & Elton, 2005; Isaacs et al., 2007; Leijon, Bendtsen, Nilsen, Festin, & Ståhle, 2009; Sørensen, Kragstrup, Skovgaard, & Puggaard, 2008; Taylor, Doust, & Webborn, 1998) while reducing the time resource burden physicians face.

More recently, the use of multi-component interventions that combine physical activity counselling, prescription and referral strategies, in particular those linking healthcare and community-based resources, have been recommended (Lobelo et al., 2014; Patrick et al., 2009). Integrating physical activity counselling, prescription and referral strategies into primary care practice has been found to be feasible and cost-effective (Garrett et al., 2011; Hogg et al., 2012; Murphy et al., 2012). Thus, it appears that such multi-component approaches can be implemented within established practices with the use of existing resources available in primary care.

On the whole, results from these studies are positive and favour the effectiveness of physician physical activity promotion strategies implemented in primary care. However, methodological drawbacks should be considered when interpreting these findings. The generalizability of these findings, for instance, is limited given that studies were conducted with samples of limited representativeness. In addition, studies employed different physical activity measures, which limits outcome comparisons between studies. Further, although some studies employed objective measures of physical activity or cardiorespiratory fitness, most of the studies employed self-reported measures, which may have introduced responder bias. In these studies, patient physical activity was
measured for up to 12 months; thus, the long-term effectiveness of these strategies remains unknown. The intervention dose and components implemented across studies also varies; thus, identifying which dose and intervention components are needed to achieve a significant improvement on patients’ physical activity is difficult. This evidence should be interpreted in light of these limitations.

Although physical activity counselling, prescription and referral strategies have not been implemented in Mexico, there are indicators that introducing these strategies would be appropriate and feasible. One indicator is that the Mexican healthcare system is changing and placing more emphasis on implementing preventive strategies that may help reduce the burden of NCDs in a cost-effective manner. For instance, physical activity promotion strategies have recently been introduced as part of preventive healthcare programs targeting NCDs. With proper cultural and practical considerations and allowing for adaptations to make physical activity promotion strategies more appropriate and feasible for the Mexican context, it appears that these can be introduced within the Mexican primary care practice.

2.5 The Role of the Physician

Physicians have been preferred as the main contact for delivering interventions to promote physical activity in primary care (Tulloch et al., 2006). Patients frequently identify primary care physicians as a preferred source of encouragement for physical activity (Petrella & Lattanzio, 2002) and view physicians as a credible source of health information (Garrett et al., 2011). It has been suggested that in low- to middle-income countries, where physicians hold a respected position, healthcare settings may exert a strong influence on patients’ behaviours (Holub et al., 2013). This may be particularly
true in Mexico where physicians are seen as figures of authority and where a paternalistic healthcare culture prevails (Ocampo-Martínez, 2002). Thus, primary care physicians are in a unique position to promote physical activity.

Current physical activity counselling practices (i.e. verbal advice, written prescription and referral) in Mexico are unknown, but evidence from other countries show that the proportion of physicians offering physical activity verbal advice, prescription and referrals is not optimal. In the United States, 30% of a national sample of primary care physicians reported that they always provide physical activity guidance to their patients (Smith et al., 2011). In Canada, 70% of a national sample of primary care physicians reported having provided physical activity counselling, 16% having offered a physical activity prescription and 10% having used physical activity referrals (Petrella, Lattanzio, & Overend, 2007). In Brazil, although 81% of a national sample of physicians reported that they recommend physical activity to their patients, their knowledge about physical activity recommendations was poor (Florindo et al., 2013).

The main barriers to physical activity counselling consistently reported by physicians are lack of time and knowledge (Abramson, Stein, Schauffele, Frates, & Rogan, 2000; Cornuz, Ghali, Di Carlantonio, Pecoud, & Paccaud, 2000; Hebert, Caughy, & Shuval, 2012), which may contribute to the low counselling rates. Other factors that appear to influence these practices include physicians’ physical activity levels, their health-related behaviours and their age (Abramson et al., 2000; Frank, Segura, Shen, & Oberg, 2010; Lobelo, Duperly, & Frank, 2009). Psychosocial factors can also influence physician practices and the use of theories to explain and influence these practices has been recommended (Eccles, Grimshaw, Walker, Johnston, & Pitts, 2005). For instance,
self-efficacy and intention have been shown to positively influence physician lifestyle counselling and encouragement of physical activity, respectively (Sassen, Kok, & Vanhees, 2011; Thompson, Schwankovsky, & Pitts, 1993).

Methodological caveats regarding physician counselling studies should be considered. First, physician counselling behaviour has been operationalized differently across studies. It has been defined as either counselling, or prescription or referral or as a combination of these. Thus, physician counselling behaviour reports entail a combination of these micro-behaviours and may explain the different counselling rates observed across studies. Likewise, counselling behaviour has been measured with heterogeneous tools of unknown validity and reliability, which compromises the accuracy of counselling estimates. Further, self-reported measures of counselling behaviour prevail, which may result in an over estimation of these practices. In fact, there is a discrepancy between physician self-reported counselling rates and objective measures (i.e. audiotapes) of counselling behaviour (Tulloch et al., 2006). Because physician counselling reports may be inflated, the actual counselling rates may be even lower than those reported in the literature. Finally, the studies discussed here are focused on physicians, but there are many studies that have studied other healthcare professionals (e.g. nurses, health educators, physical activity specialists) achieving promising outcomes (Tulloch et al., 2006). Recognizing these limitations, the present thesis focuses on physicians to promote physical activity in primary care as an initial step to introduce such strategies in Mexican healthcare settings.

Physician physical activity counselling practices need to improve. Patients are not receiving evidence-based, physical activity preventive strategies that can significantly
reduce their risk of developing NCDs. This disconnect between evidence and practice should be addressed and targeting the factors that influence physician counselling practices seems to be a necessary first step.

2.6 The Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) is a theory designed to explain and predict human behaviour in specific contexts (Ajzen, 1985). The TPB was developed as an extension of the Theory of Reasoned Action (Fishbein & Ajzen, 1975) to overcome the limitations of the latter in predicting behaviours over which people do not have complete volitional control (Ajzen & Madden, 1986). Overall, the TPB states that behaviour is predicted by a person’s intention to perform the behaviour, and by his/her perceived ability to perform it. Intention is assumed to capture motivation to perform the behaviour and reflects the amount of effort a person is willing to invest in this endeavour. The ability to perform a behaviour is captured in the construct of perceived behavioural control, which refers to the person’s perceptions regarding the ease or difficulty of performing the behaviour of interest (Ajzen, 1991). The TPB differs from the Theory of Reasoned Action in the addition of perceived behavioural control (Ajzen & Madden, 1986). According to the TPB, a person should succeed in performing a behaviour if he/she has the intention to, and the necessary resources to, perform it (Ajzen, 1991).

The TPB postulates that behavioural intention is influenced by attitude, subjective norm, and perceived behavioural control. Attitude is a personal factor that refers to the extent to which a person has a favourable or unfavourable evaluation of the behaviour. Beliefs about the expected outcomes and whether performing the behaviour will produce those outcomes influence attitude toward the behaviour. Subjective norm is a social
factor that refers to the perceived social pressure to engage or not engage in the behaviour in question. Beliefs about the expectations of referent individuals regarding the behaviour influence subjective norm to the extent that the individual is motivated to comply with those expectations. Perceived behavioural control is assumed to reflect past experience and anticipated impediments or obstacles. Perceived behavioural control is influenced by beliefs about the presence of impeding or facilitating factors and about the power one has over these factors (Ajzen, 1991).

In general, the more favourable the attitude and subjective norm toward the behaviour, and the greater the perceived behavioural control, the stronger the intention to perform the behaviour. Each of these constructs is an independent predictor of intention and the relative importance of each is expected to vary across situations and behaviours (Ajzen, 1991). Given the facilitating and impeding factors that may be encountered in the execution of a behaviour, the TPB postulates that perceived behavioural control has a direct influence on behaviour, independent of intention (Ajzen, 1991; Ajzen & Madden, 1986). Thus, intention and perceived behavioural control, whether individually or together, can predict behaviour. See TPB model in Figure 1.

The TPB has been shown to be an appropriate theory for explaining physician behaviour (Godin, Belanger-Gravel, Eccles, & Grimshaw, 2008; Perkins et al., 2007). A systematic review showed that the TPB explained an average of 31% of the variance across different physician behaviours including prescription, referral, counselling, and guideline adherence (Godin et al., 2008). In a study looking at physicians’ test-requesting behaviour, intention was found to explain an average of 11% of the variance on behaviour, and attitude was found to be the main predictor of intention (Ramsay,
Thomas, Croal, Grimshaw, & Eccles, 2010). In another study, normative control and behavioural beliefs explained 13% of the variance in physician adherence to prescription guidelines (Rashidian & Russell, 2010). Finally, another study found that intention was the main factor explaining 29% of the variance in physician encouragement of physical activity, where attitude was the main predictor of intention (Sassen et al., 2011). Thus, the use of theories for designing interventions aimed at changing physician practices has been recommended (Eccles et al., 2005) and the TPB has been identified as a preferred model for this endeavour (Godin et al., 2008; Perkins et al., 2007).

Figure 1. The Theory of Planned Behaviour (Ajzen, 2006).

The TPB was developed within the United States and evidence about its predictive power comes mainly from high-income countries. The theory has not been tested in Mexico and its cultural appropriateness for the Mexican population should be approached with caution. However, the TPB is a context-specific theory and cross-cultural studies have shown that the TPB explains behaviour across cultures with variation in predictors of intention and behaviour (Hagger, et al., 2007; Van Hooft, Born, Taris, & Van Der Filer, 2006). Among physicians, studies have shown that the theory
predicts intention and behaviour in different populations, although variations in predictors exist. For instance, the TPB has been shown to explain physician intention and behaviour in the United States, Scotland, Canada, England, Finland and the Netherlands (Godin et al., 2008; Kortteisto, Kaila, Komulainen, Mäntyraanta, & Rissanen, 2010; Rashidian & Russell 2010; Sassen, et al., 2011) with predictors of intention and behaviour differing across studies.

The paternalistic Mexican healthcare culture (Ocampo-Martínez, 2002) and the social pressure from groups and institutions experienced within the Mexican medical culture (Martínez-García, 1995) are factors that may play a role in physician physical activity counselling behaviour. Further, the economic challenges the Mexican healthcare system faces (Frenk, Gómez-Dantés, Knaul, 2009) could also impact physical activity counselling practices. The TPB captures some of these socio-cultural factors and provides insight on physician counselling behaviour within the context of Mexico. Whether the TPB is culturally appropriate is difficult to ascertain, but studying the theory within the context of Mexico represents a first step towards this end.

2.7 The Role of the Healthcare Environment

Environments in which people live, learn, work and play can either promote or deter physical activity (Sallis & Glanz, 2009). Physical activity environments are places where people can be physically active (Sallis & Glanz, 2009), such as homes, neighbourhoods, parks, sports facilities, schools, churches, and workplaces. These environments have been the focus of physical activity promotion strategies because they can affect whole populations for long periods of time (Crespo, Sallis, Conway, Saelens, & Frank, 2011). Built environments, which are places built or designed by humans, have
an important role in the promotion of physical activity (Sallis, Floyd, Rodriguez, & Saelens, 2012). For instance, availability, proximity, accessibility, and aesthetic qualities of physical activity environments have been shown to influence physical activity in adults (Bauman et al., 2012; Sallis et al., 2012). Evidence from low- and middle-income countries is scarce, but existing studies show that perceived access to recreational facilities and urbanization are positively associated with physical activity (Bauman et al., 2012).

The built environment can affect the development of NCDs through physical activity (Sallis et al., 2012); thus, physical activity opportunities should be available in every environment where physical activity can take place. Leisure, transportation, occupational and household physical activity are likely influenced by different environments, which provide multiple opportunities and settings for intervention (Sallis et al., 2006). Physical activity environments have been categorized into micro- (doctor’s office, home neighbourhood, workplace), meso- and exo- (direct prompts, family considerations and external social prompts/networks) and macro-environments (policies, health care systems) and each of these can influence physical activity (Spence & Lee, 2002). For instance, a healthcare system may not prioritize physical activity promotion policies and strategies. As a result, clinics and hospitals may not implement strategies to promote physical activity within the building or connect people with resources available in the community. Finally, a physician may not prompt/support physical activity in his/her practice (e.g., via physician counselling, written materials), meaning that patients may not receive help in changing their physical activity behaviour.
The primary care setting is a micro-environment where both patients and employees can be reached (Proper & Mechelen, 2008; Tulloch et al., 2006) and where physical activity can be effectively promoted (Meyer et al., 2010; Patrick et al., 2009). Environmental strategies used in primary care settings to promote physical activity can be informational, educational, and instrumental. Informational strategies focus on increasing awareness about physical activity areas in the primary care setting and on prompting people to use them. Examples include putting signs and floor stickers at the point of choice between stairs and elevators, which have been shown to increase stair use in healthcare and other settings (Bungum, Meacham, & Truax, 2007; Meyer et al., 2010).

Educational strategies focus on teaching people about the benefits of physical activity and ways to be physically active. Examples include displaying educational posters and offering brochures or self-help materials, which have been shown to increase regular physical activity (Marcus et al., 1998; Plotnikoff et al., 2007). Instrumental strategies focus on the built environment to make it supportive of physical activity. The quality of the built environment such as availability, accessibility, attractiveness, safety, and convenience of stairs, walking paths, exercise facilities, and outdoor spaces can enhance physical activity (Crespo et al., 2011; Dodson, Lovegreen, Elliott, Haire-Joshu, & Brownson, 2008; Kerr, Yore, Ham, & Dietz, 2004; Meyer et al., 2010; Nicoll, 2007; Nicoll & Zimring, 2009). Examples of instrumental strategies include building walking paths, improving the conditions of stairs, and limiting access to elevators, which can lead to increases in physical activity within the primary care setting (Kerr et al., 2004; Naito et al., 2008; Nicoll & Zimring, 2009; Olander & Eves, 2011).
For their potential to promote physical activity, environmental strategies have been implemented in healthcare settings in the United States, Canada and Europe (CDC, 2012; Groene & Garcia-Barbero, 2005; OHPHN, 2008; WHO, 2006). In the United States, the Center for Disease Control and Prevention has launched a campaign called *Healthy Hospital Practice to Practice*, where one of the main objectives is to increase employees’ physical activity by promoting the use of pedestrian paths, stairs and physical activity-related resources (CDC, 2012). The *Health Promoting Hospitals* initiative, launched by the World Health Organization (WHO, 2006), is being implemented in Canada and Europe; one of its objectives is to optimize healthcare environments by providing more opportunities for employees and patients to improve their physical activity (OHPHN, 2008; WHO, 2006). These initiatives have been implemented in hospitals, community health centers, and primary care clinics, demonstrating their feasibility.

Mexico could benefit from introducing such environmental strategies to promote physical activity in primary care settings. For instance, a healthcare environment conducive to physical activity could improve physician physical activity levels, which have been shown to influence their counselling behaviours (Abramson et al., 2000; Lobelo et al., 2009). Further, physicians could experience the health benefits of increased physical activity and could serve as role models for their patients (Lobelo et al., 2009; Rogers et al., 2005). Finally, patients could engage in active behaviours by taking the stairs, using walking paths or by participating in physical activity programs that are offered at many primary care clinics in Mexico. Whether Mexican healthcare environments are promoting physical activity is unknown. As a first step, it is necessary
to assess Mexican healthcare environments and determine what strategies are in place and which are needed. This can inform future environmental strategies that can benefit patients and healthcare employees.

2.8 Knowledge Translation: From Evidence to Clinical Practice

Knowledge translation (KT) is a systematic process through which best available evidence is synthetized, disseminated and used in clinical practice to improve healthcare services and outcomes (Straus, Tetroe, & Graham, 2009). The KT process involves the collecting, summarizing, and packaging of evidence and its delivery in a timely manner and appropriate format (Straus et al., 2009). Further, KT is concerned with the process of implementing, monitoring and maintaining the use of evidence in practice and with addressing the barriers inherent to this process (Straus, Tetroe, & Graham, 2011).

Because the KT process can be slow and haphazard, several frameworks have been proposed to guide these efforts (Rycroft-Malone, 2007). The use of such frameworks is necessary to develop testable and useful KT strategies (Estabrooks, Thompson, Lovely, & Hofmeyer, 2006). Examples of prominent KT frameworks include the Diffusion of Innovations Theory (Rogers, 2003), the Knowledge-to-Action (KTA) Framework (Graham et al., 2006), and the Ottawa Model of Research Use (Logan & Graham, 1998). The feasibility and effectiveness of most KT frameworks is limited (Straus et al., 2009), and there is no consensus regarding which framework is the most comprehensive and appropriate. Given the range of contextual factors and processes involved in KT, there is debate on whether a single overarching KT framework can or should exist (Estabrooks et al., 2006). Thus, it has been recommended that KT
frameworks be selected on the basis of their elements, action categories and the context fit (Straus et al., 2009).

The KTA framework was derived from common elements and actions identified in a review of 31 frameworks (Graham et al., 2006; Graham & Tetroe, 2007). KTA recognizes the creation and dissemination of knowledge, provides an understandable guide for knowledge producers and users and outlines actions needed to promote the use of evidence in clinical practice. The KTA framework has demonstrated face and content validity through a number of unpublished studies and implementation projects (Graham & Tetroe, 2007). Thus, the KTA framework seems to be an appropriate model for guiding KT efforts aimed at introducing evidence-based physical activity promotion strategies in primary care practice.

According to the KTA framework (Graham et al., 2006), the KT process occurs in three phases. First, a problem (gap) in practice is identified and the relevant evidence to address it is selected and synthetized. Second, the selected evidence is adapted to the context and system in which it will be used, the barriers and facilitators to use the evidence are assessed, and an intervention to promote evidence uptake is selected. Finally, the intervention is implemented and evaluated, and strategies for monitoring and promoting the continual use of evidence are employed (see KTA framework in Figure 2).

Evidence-based physical activity counselling strategies can be translated into routine practice (Eakin, Brown, Marshall, Mummery, & Larsen, 2004). An evidence-based tool that has been employed in physical activity counselling is the 5-As model (Meriwether, 2008). The 5-As (Assess, Advise, Agree, Assist, and Arrange) model is a five-step protocol originally developed to assist physicians in their lifestyle counselling
practice (Elford, Yeo, Jennett, & Sawa, 1999). This model has been widely employed for physical activity counselling and has been shown to be effective for promoting physician physical activity counselling and patient physical activity (Estabrooks, Glasgow, & Dzewaltowski, 2003). Using this model, physicians first Assess patients physical activity levels; then, physicians Advise patients to increase their physical activity; then physicians and patients Agree on a physical activity plan; then, physicians Assist patients in identifying barriers to their physical activity plan; finally, physicians Arrange follow-up visits or patient physical activity referrals (Estabrooks, Glasgow, & Dzewaltowski, 2003). The 5-As model is an appropriate knowledge tool to address the low physical activity counselling rates among physicians.

Training and educational approaches are commonly used strategies to promote the uptake of evidence-based tools in clinical practice (Scott et al., 2012). In fact, training and educational approaches have been identified as key strategies to advance the status of physical activity promotion in primary care (Lobelo et al., 2014). Physician training strategies implemented in United States, Finland and Argentina have been shown to improve physician self-efficacy for physical activity counselling, physical activity counselling and prescription rates, and patients’ cardiovascular health (Aittasalo, Miiunpal, Ståhl, & Kukkonen-Harjula, 2007; Eckstrom, Hickam, Lessler, & Buchner, 1999; Marcus et al., 1997; Zilberman et al., 2012). The Exercise is Medicine® initiative has implemented several physical activity counselling courses in some Latin American countries (Lobelo et al., 2014), which shows the feasibility and increasing interest for such training. Thus, physician training appears to be a feasible and promising strategy for improving evidence-based physical activity counselling practices among physicians.
The use of behaviour change theories to promote evidence-based practice among physicians has been recommended (Eccles et al., 2005) and training strategies can be framed on such theories. Among behaviour change theories, the TPB has been recommended for informing strategies aimed at promoting physician adoption of evidence in practice (Perkins et al., 2007). The TPB has been shown to explain an array of physician practices, including prescription and counselling (Godin et al., 2008). Further, the TPB has been shown to be a useful model to explain and interpret results of KT intervention trials targeting physician practices (Ramsay et al., 2010). In light of this, the TPB provides a good model to inform physician training strategies aimed at improving physical activity counselling practices.

**Figure 2.** Knowledge-to-Action Framework (Graham et al., 2006).
2.9 RE-AIM: An Evaluation Framework for Effectiveness Research

The third phase of the KTA framework deals with intervention impact on knowledge use and the impact of this knowledge on patient, physician and system outcomes. However, the KTA framework lacks a detailed evaluation strategy and indicators relevant for this phase. The RE-AIM framework can be used to overcome this limitation. The RE-AIM framework was developed to move from an efficacy-focused research paradigm to an effectiveness paradigm that can better inform public health and healthcare practice (Glasgow, Vogt, & Boles, 1999). In efficacy research, interventions are implemented under highly controlled conditions producing effects that only apply to study participants, while in effectiveness research, interventions are implemented under conditions that can be replicated in practice, thereby producing effects that apply to larger proportions of the population (Glasgow, Lichtenstein, & Marcus, 2003). RE-AIM was developed to assess the degree to which health-related interventions are designed and reported with consideration for external validity factors that promote their translation into public health and clinical practice (Glasgow et al., 1999). The framework was inspired by the Diffusion of Innovations Theory (Rogers, 2003) and by the PRECEDE-PROCEED model for health promotion planning (Green, Kreuter, Deeds, & Partridge, 1980).

The RE-AIM framework includes the assessment of: Reach (i.e., representativeness of participants), Effectiveness (i.e., intervention impact), Adoption (i.e., representativeness of settings and delivery agents), Implementation (i.e., intervention fidelity), and Maintenance (i.e., program long term impact and sustainability; (Glasgow et al., 1999). The Reach and Effectiveness dimensions assess individual-level outcomes, while the Adoption and Implementation dimensions measure
organization-level outcomes. The Maintenance dimension measures both individual- and organization-level outcomes. Attention to these dimensions when designing and evaluating health interventions is imperative to determine which programs work, for whom, and under which conditions. The reporting of these dimensions is also imperative to facilitate their translation into public health and healthcare practice and to assist decision makers in identifying effective intervention programs and policies.

Numerous published studies and grant applications have used RE-AIM, although the fidelity and application of the framework has not been adequate (Kessler et al., 2012). The framework has been used to plan health interventions (Klesges, Estabrooks, Dzewaltowski, Bull, & Glasgow, 2005), evaluate health interventions (Eakin et al., 2007), evaluate health policy impact (Jilcott, Ammerman, Sommers, & Glasgow, 2007), assess the literature (Allen, Zoellner, Motley, & Estabrooks, 2011), and to compute composite metrics to estimate intervention impact (Glasgow, Klesges, Dzewaltowski, Estabrooks, & Vogt, 2006).

The RE-AIM framework has also been used for evaluating physical activity interventions delivered in primary care (Aittasalo et al., 2007; Eakin et al., 2004) and for assessing the external validity reporting of physical activity interventions delivered in these settings (Eakin, Smith, & Bauman, 2005). For instance, in a RE-AIM review of the physical activity counselling literature, it was concluded that greater attention to external validity factors, such as the feasibility of introducing counselling and generalizability, is needed (Eakin et al., 2005). In a study investigating the effectiveness of a physical activity prescription intervention in primary care, RE-AIM indicators showed that the intervention was successful in reaching the targeted healthcare units, was successfully
implemented with potential for institutionalization, but was not effective in increasing physical activity counselling among physicians (Aittasalo et al., 2007). Thus, RE-AIM is a useful framework for systematically evaluating physical activity promotion interventions delivered in primary care settings and has been recommended to improve the external validity and relevance of research in primary care practice (Glasgow, 2006).

RE-AIM developers introduced 21 validated indicators (Glasgow, Klesges, Dzewaltowski, Bull, & Estabrooks, 2004) concerned with internal and external validity that can be used during the third phase of the KTA framework. Reach indicators \((n=5)\) can be used for determining which participants were reached with the intervention, effectiveness indicators \((n=4)\) to determine the impact of the intervention, adoption indicators \((n=6)\) to determine which settings adopted the intervention, implementation indicators \((n=3)\) to monitor intervention delivery and knowledge use, and maintenance indicators \((n=3)\) to monitor and promote the impact and sustainability of knowledge use (see Table 1). Employing RE-AIM during the third phase of the KTA framework can strengthen evaluation efforts and help understand the implementation, impact and sustainability of both KT interventions and evidence-based physical activity counselling practices.

Table 1. RE-AIM dimensions and validated indicators.

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<th>RE-AIM indicators</th>
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<td><strong>Reach</strong></td>
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<td>Method to identify target population</td>
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<td>Inclusion criteria</td>
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<td>Exclusion criteria</td>
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<td>Participation rate</td>
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<td>Characteristics of participants and non-participants</td>
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<td><strong>Efficacy/Effectiveness</strong></td>
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Results for primary outcome
Intent-to-treat or present at follow up analysis
Quality-of-life or potential negative outcome measures
Percent attrition

Adoption
Description of intervention location
Description of staff who delivered intervention
Method to identify staff who delivered intervention
Level of expertise of delivery agent
Inclusion/exclusion criteria of delivery agent or setting
Adoption rate of delivery agent or Setting

Implementation
Intervention duration and frequency
Extent protocol delivered as intended
Measures of cost of implementation

Maintenance
Assessed outcomes >6 months post intervention
Indicators of program-level maintenance
Measures of cost of maintenance

2.10 Rationale, Description and Context of the Dissertation

Information about physical activity promotion in Mexican primary care settings is lacking. Specifically, physicians’ physical activity counselling practices and the factors that influence these practices are unknown. Further, whether the informational, educational and instrumental environments of Mexican healthcare settings are promoting physical activity is unknown. Consequently, interventions that can address existing gaps in primary care practice have not been developed. The KTA framework can help address these questions and inform the development and implementation of approaches to improve physical activity promotion practices in Mexican healthcare settings.

Three studies were designed and conducted in collaboration with the Jalisco Secretary of Health. These studies were conducted in the state of Jalisco (population =
7.5 million), the fourth largest state in Mexico, from the spring of 2012 to the spring of 2013. In Jalisco, 87% of the population lives in urban areas, 51% are women and the average level of education is nine years, which is similar to national estimates (INEGI, 2012). Jalisco has 125 municipalities that are grouped into 13 sanitary regions in which the Secretary of Health coordinates healthcare services and programs offered to the uninsured population. In study 1, the physical activity prescription practices of 633 Mexican primary care physicians and the psychosocial factors influencing this behaviour were explored. This study was guided by the TPB and employed structural equation modelling to explore the influence of TPB predictors on prescription behaviours.

Healthcare environments are complex and assessing these settings is essential for understanding the context and determining the fit of knowledge translation efforts (Estabrooks et al., 2006). To better understand the Mexican healthcare context, the informational, educational and instrumental environments of 40 healthcare clinics and hospitals in Guadalajara were assessed in study 2. A tool for assessing these healthcare environments was developed for this study. In Study 3, a training intervention to improve physical activity counselling practices among primary care physicians was developed, implemented and evaluated. The training intervention was framed on the TPB and was aimed at promoting the implementation of evidence-based physical activity counselling practices among physicians. The intervention was evaluated using the RE-AIM framework.

The fit of the studies within the KTA framework is as follows. In phase one, low physical activity prescription rates among Mexican physicians were observed, suggesting that patients are not receiving preventive care that can help them reduce their risk for
NCDs (Study 1). Further, an evidence-based physical activity counselling protocol, the 5-As (Assess, Advice, Assist, Agree and Arrange) model, was identified as an appropriate knowledge tool to address this gap. The 5-As model is a five-step protocol designed to help physicians counsel on physical activity that has been shown to be effective for improving physician counselling and for promoting patient physical activity (Estabrooks, Glasgow, & Dzewaltowski, 2003). In phase two, the factors influencing physician physical activity counselling practices and the barriers to these practices were identified (Study 1). To better understand the Mexican healthcare context, healthcare settings were also assessed; information was collected about environmental physical activity promotion strategies present in these settings (Study 2). Next, a tailored intervention aimed at improving physician physical activity counselling was developed and implemented (Study 3). In phase three, the training intervention was evaluated. Specifically, the Reach, Effectiveness, Adoption, Implementation and Maintenance of the physician training strategy were evaluated (Study 3). This dissertation provides evidence of the applicability and feasibility of using the KTA framework within the context of a middle-income country, demonstrates the usefulness of integrating the TPB and the RE-AIM framework within a KTA-guided strategy, and sheds light on potential strategies for promoting evidence-based physical activity promotion practices within Mexican healthcare settings.

2.11 References


Chapter 3

Physical Activity Prescription Among Mexican Physicians: a Structural Equation Analysis of the Theory of Planned Behaviour

Abstract

Aim: To describe the PA prescribing behaviour of Mexican primary care physicians and determine if the Theory of Planned Behaviour (TPB) explains this behaviour. Methods: 633 physicians (56% male, mean age 38 years) from 305 primary care clinics in Jalisco, Mexico self-reported PA prescription behaviour, PA involvement, and attitude, subjective norm, perceived behavioural control (PBC), and intention related to PA prescription behaviour. Structural equation modelling was employed. Results: 48% of physicians always ask patients about their PA, 33% provide verbal prescriptions, 6% provide written prescriptions, 8% refer patients to PA resources, and 4% assess patient fitness. The fit of the TPB model was satisfactory (RMSEA=0.05, CFI=0.98, SRMR=0.05), where PBC ($\beta=.41, p<.05$) and physician PA ($\beta=.16, p<.05$) explained prescription behaviour. Discussion: The TPB proved to be useful for explaining prescription behaviour, although not all the theory tenets were supported. Subjective norm and attitude were the only factors influencing behavioural intention, while PBC and physician PA were the only predictors of behaviour. Conclusion: Strategies aimed at improving physicians’ perceived ability to prescribe PA and their own PA involvement seem worthwhile.
Introduction

Physical inactivity is a major contributor to the non-communicable disease epidemic worldwide [1]. Inactivity estimates among the Mexican adult population range from 17% to 38% [2, 3] and non-communicable diseases, namely cardiovascular disease and diabetes, represent the principal causes of death in the country [4-6]. The primary care setting has been recognized as an appropriate venue for promoting physical activity [7, 8] given that the inactive population can be effectively reached there [9]. Evidence from randomized control trials shows that interventions delivered in primary care can improve patient physical activity, with some sustainable changes for up to 12 months [10]. For instance, brief counselling [11, 12], prescriptions [13-15] and physician referrals to resources in the community [16-20], including counsellors [21, 22], have been shown to promote short-term improvements in patient physical activity. Integrating these strategies into primary care practice has been found to be feasible and cost-effective [23-25].

Patients view physicians as a credible source of health information [23], which puts physicians in a unique position to promote physical activity. It has been suggested that in developing countries, where physicians hold a respected position, healthcare settings may exert a strong influence on patients’ behaviours [26]. Current physical activity prescription practices in Mexico are unknown, but evidence from other countries show that the proportion of physicians offering physical activity counselling and prescriptions is not optimal. In the United States, 30% of a national sample of primary care physicians reported that they always provide physical activity guidance to their patients [27]. In Canada, 70% of a national sample of primary care physicians reported having provided physical activity counselling, 16% having offered a physical activity
prescription and 10% having used physical activity referrals [28]. In Brazil, although 81% of a national sample of physicians reported that they recommend physical activity to their patients, their knowledge about physical activity recommendations was low [29]. The main barriers to physical activity counselling and prescription consistently reported by physicians are lack of time and knowledge [30-32], which may contribute to these low counselling and prescription rates. Other factors that appear to influence these practices include physicians’ physical activity levels, their health-related behaviours and their age [30, 33, 34].

Several psychosocial factors influence physician behaviours and the use of theories to explain and change physician behaviour has been recommended [35]. The Theory of Planned Behaviour (TPB) has been shown to be an appropriate theory for explaining physicians’ behaviour [36]. The TPB recognizes that an individual’s behaviour is influenced by his/her intention to engage in that behaviour [37]. Intention is in turn influenced by three psychosocial constructs: attitude, subjective norm, and perceived behavioural control [38]. The TPB has been shown to explain an array of physician behaviours including vaccination practices [39], screening/testing practices [40, 41], guideline adherence [42], and the encouragement of physical activity [43].

Most evidence about physicians’ physical activity prescription practices and the utility of the TPB for explaining these practices comes from developed countries. Mexican physicians’ physical activity prescription rates and the factors that influence these practices are unknown. Gathering this evidence is imperative to inform future physical activity promotion strategies relevant to Mexico. Therefore, the purpose of this
study was to describe the physical activity prescription practices of Mexican physicians and to determine if the tenets of the TPB explain this behaviour.

**Method**

**Context**

This cross-sectional study was conducted in the State of Jalisco (population = 7.5 million), the fourth largest state in Mexico, in the spring/summer of 2012. In Jalisco, 87% of the population lives in urban areas, 51% are women and the average level of education is nine years, which is similar to national estimates [44]. Thus, Jalisco offers a good representation of the country. Jalisco has 125 municipalities that are grouped into 13 sanitary regions in which the Secretary of Health coordinates healthcare services and programs offered to the Jalisco population who do not have social security insurance.

**Sampling and Recruitment**

The Jalisco Secretary of Health has 906 urban and rural primary care clinics, regional hospitals and healthcare units. From these, a cluster sample of 400 primary care clinics and hospitals was randomly selected from a list provided by the Secretary. The sample was stratified by sanitary region and municipality. The desired sample size was arrived at by ensuring that primary care clinics and hospitals from every municipality in Jalisco were selected. Only clinics and hospitals that had valid contact information were selected. Secretary of Health staff called the directors of the selected clinics/hospitals to invite them to participate in the study. Those who agreed to participate were asked to email the study invitation and questionnaire to all of the physicians working in their institution. Eligible physicians were male and female primary care physicians of any age, from any medical specialty and currently working in the selected clinics/hospitals. This
study was approved by the General Research Ethics Board from Queen’s University, Canada.

Measures

Demographic information including physician sex, age, years of practice, medical specialty and type of population (rural/urban) served was collected. Physician physical activity promotion practices was measured using a scale employed in the National Family Physician Workforce Survey of Canada [28]. This scale contains five items measuring the frequency with which physicians: 1) ask patients about their physical activity, 2) offer verbal prescription, 3) offer written prescription, 4) conduct fitness evaluations, and 5) refer patients to physical activity resources. Answers were anchored on a five-point scale ranging from Never=1 to Always=5. The verbal and written prescription items (i.e., items 2 and 3 above) were averaged to obtain a single indicator hereafter referred to as physical activity prescription behaviour. The remaining items were not used in the statistical analyses, but are presented descriptively in the results. Physicians were also asked about the barriers to physical activity prescription they experience in their practice by having them select the barriers relevant to them from a list provided. Physician knowledge about prescribing physical activity was measured using three questions where answers were dichotomous (Yes/No) and open-ended. Physicians were asked if they knew about: the International Physical Activity Guidelines [45], FITT principle (frequency, intensity, type and time) for prescribing physical activity, and the different physical activity intensities (light, moderate, vigorous). When they answered yes, they were asked to describe each of these concepts.
An adapted version of a validated TPB questionnaire [41] was employed to measure the psychosocial constructs hypothesized to influence physician physical activity prescription behaviour. The questionnaire had four scales, each measuring one construct of the TPB, with answers anchored on a seven-point scale. Physicians’ attitude toward physical activity prescription were measured with four items (e.g. I think that prescribing physical activity is generally: 1=useful to 7=not useful); subjective norm was measured with four items (e.g. Most general practitioners would prescribe physical activity: 1=strongly agree to 7=strongly disagree); perceived behavioural control was measured with five items (e.g. Prescribing physical activity to my patients is: 1=very easy to 7=very difficult); and intention to prescribe physical activity was measured with three items (e.g. I intend to prescribe physical activity to my patients within the next six months: 1=strongly agree to 7=strongly disagree). These items were reverse coded for the data analysis. The mean of these items for each scale was used as an indicator of each construct. An average internal consistency of $\alpha=0.87$ for the four scales has been previously reported [41]. In this study, one item from the subjective norm scale was dropped to improve internal consistency; the average internal consistency observed for the four scales was $\alpha=0.80$.

Godin’s Leisure-Time Exercise Questionnaire [46] was used to measure physicians’ physical activity levels. This questionnaire assesses frequency of light, moderate, and vigorous leisure-time physical activity lasting at least ten minutes per session over an average week. To obtain a composite score, the weekly frequencies of light, moderate, and vigorous physical activity were multiplied by their metabolic equivalent (MET) values of nine, five, and three respectively. The vigorous and moderate
physical activity scores were summed to classify physicians as active (≥24 points) or inactive (<24 points) [46]. The questionnaire’s reliability \( r = .74 \) and validity \( r = .56 \) with maximum oxygen consumption) have been established in adults [46].

**Procedures**

The study questionnaire was translated into the Spanish language using the back-translation method [47]. The final Spanish questionnaire was designed as an online questionnaire that physicians could access by clicking on a link in an e-mailed invitation. A paper version of the questionnaire was also prepared. Consenting physicians completed the questionnaire online or on paper in cases where Internet access was not available.

**Statistical Analysis**

Descriptive statistics were computed to explore the data. Chi square tests were used to examine associations among demographic variables. Bivariate Pearson correlations were also computed for the psychosocial variables. Structural equation modelling was employed to test the fit of the TPB model using the maximum likelihood method. Cases with missing data were not included in this analysis. A correlation matrix was used to fit the theory model. The overall model fit was evaluated using the Root-Mean-Square Error of Approximation (RMSEA), the Standardized Root Mean Square Residual (SRMR) and the Comparative Fit Index (CFI). The RMSEA and SRMR indices measure the discrepancy between the predicted model and the observed model; values lower than .08 are interpreted as acceptable fit, with lower values indicating better fit [48]. The CFI measures the extent to which the model of interest is better than an alternative model where measured variables are uncorrelated; values closer to 1 are considered acceptable fit [48]. For this study, RMSEA values lower than 0.06, SRMR values lower than 0.08 and CFI values greater than 0.95 were considered as indicative of
good model fit. Statistical significance was set at \( \alpha=0.05 \). The analyses were conducted with the Statistical Package for Social Sciences version 18 and LISREL version 9.1 for Windows.

**Results**

A total of 305 clinics representing 101 municipalities from the 13 sanitary regions in Jalisco participated in the study. From these clinics, 633 physicians completed the questionnaire. Physician demographic characteristics are presented in Table 1. Approximately 48% of physicians reported that they always ask patients about their physical activity levels, 33% reported that they always provide *verbal physical activity prescription*, 6% indicated that they always provide *written physical activity prescription*, 4% reported that they always *assess patient fitness*, and 8% indicated that they always *refer patients to physical activity resources in the community*. About half of the physicians (52%) who always provide verbal or written physical activity prescriptions, do so for patients experiencing chronic diseases/unhealthy weights, while the other half (48%) do so for all of their patients. Female physicians reported asking patients about their physical activity levels more frequently than male physicians (mean 4.5 vs. 4.3, \( p<.05 \)). More than half of physicians (64%) were classified as physically active.

The main barriers to prescribing physical activity were having no time (14%) and perceiving that patients would not follow the prescription (7%). Experiencing these barriers was not associated with providing verbal or written physical activity prescriptions (\( p>.05 \)). Regarding knowledge, 25% of physicians reported knowing the different physical activity intensities, 15% were familiar with the FITT principle and 12% knew the international physical activity guidelines. However, most of the descriptions
physicians provided to explain the FITT principle and the physical activity guidelines were incorrect. Physician knowledge was associated with providing written physical activity prescriptions; those physicians who were not familiar with the guidelines ($X^2=14.3$, $df=1$, $p<.001$), the FITT principle ($X^2=5.1$, $df=1$, $p<.05$) or the different physical activity intensities ($X^2=7.9$, $df=1$, $p<.01$) were less likely to provide written prescriptions to their patients. Physician knowledge was not associated with verbal physical activity prescription ($p>.05$).

Table 1. Physician sample characteristics (N=633).

<table>
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<th>Variable</th>
<th>Statistic/Proportion</th>
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<tr>
<td><strong>Demographics</strong></td>
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<tr>
<td>Age (mean (SD))</td>
<td>38 (12.5)</td>
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<td>Male (n (%))</td>
<td>352 (56)</td>
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<td>Urban (n (%))</td>
<td>306 (48)</td>
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<td><strong>Medical specialty</strong></td>
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<td>General medicine (n (%))</td>
<td>519 (82)</td>
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<td>Specialty/Master’s (n (%))</td>
<td>66 (10.4)</td>
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<tr>
<td>Years of practice (mean (SD))</td>
<td>12 (10.8)</td>
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<td><strong>Prescription practices (mean (SD))</strong></td>
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<tr>
<td>Ask about PA</td>
<td>4.4 (0.7)</td>
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<tr>
<td>Provide PA verbal prescription</td>
<td>4.0 (0.9)</td>
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<tr>
<td>Provide PA written prescription</td>
<td>2.5 (0.9)</td>
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<tr>
<td>Assess patients’ fitness</td>
<td>2.2 (1.1)</td>
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<tr>
<td>Refer patients</td>
<td>2.3 (1.3)</td>
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<tr>
<td><strong>Physical activity</strong></td>
<td></td>
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<tr>
<td>Godin PA score (mean (SD))</td>
<td>53 (31)</td>
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<tr>
<td>Classified as active (n (%))</td>
<td>407 (64)</td>
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<tr>
<td><strong>TPB constructs (mean (SD))</strong></td>
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SD = standard deviation; PA = physical activity

*a Measured on a scale from 1=never to 5=always

*b Based on questionnaire’s scoring methods

*c Measured on a scale from 1=low to 7=high
Overall, physicians had a positive attitude, experienced social pressure, and had a high intention to prescribe physical activity, but perceived their ability to prescribe physical activity as less than optimal (see Table 1). The TPB measured variables, physician physical activity, physician age, and physician prescription behaviour were used in the structural equation modelling analysis. Physician sex was not a significant predictor in this model and was not included. Only 604 cases had complete data and were included in this analysis. The TPB variables were not normally distributed (skewness >2 kurtosis >5) and were thus transformed using the reciprocal transformation method. The measurement model was specified allowing measured variables to load onto their corresponding latent variables and to correlate based on the TPB tenets. To standardize the scale of the parameter estimates, the factor loading of one measured variable for each scale was fixed at 1. The structure model was specified based on the tenets of the TPB and its influence on physician physical activity prescription behaviour, where physician physical activity and age were included to account for their influence on prescription behaviour. The correlations among measured variables are presented in Table 2.

Based on the fit indices and guidelines set for this study (RMSEA <.06, SRMR <.08 and CFI >.95), the fit of the model was deemed satisfactory. The RMSEA=.05 (90% CI .049-.061) and SRMR=.05 values obtained indicate that the predicted TPB model was consistent with the actual observed model. Further, the CFI=.98 obtained indicates that the proposed TPB model was better than a null model. Regarding the measurement model, all of the completely standardized parameter estimates obtained were significantly different from zero (t >1.96) and loaded satisfactorily onto their corresponding latent variable (factor loadings ranging from 0.45 to 0.89). For the structure model, completely
standardized parameter estimates indicated that subjective norm was the strongest predictor of intention to prescribe physical activity ($\beta=.76, p<.05$) followed by attitude ($\beta=.14, p<.05$). Perceived behavioural control did not have a significant impact ($\beta=.03, p>.05$). Regarding prescription behaviour, only perceived behavioural control ($\beta=.41, p<.05$) and physician physical activity ($\beta=.16, p<.05$) were significant predictors. The path diagram with the completely standardized parameter estimates is presented in Figure 1.
Table 2. Correlations among study variables used in the structural equation modelling analysis.

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INT=Intention; VP=verbal prescription; WP=written prescription; ATT=Attitude; SUB=Subjective norm; PBC=Perceived behavioural control; PA=Physical activity.
*Significant at $p<.01$
**Significant at $p<.05$
Figure 1. Structural equation model for physician physical activity prescription behaviour with completely standardized parameters.

Attitude

Subjective norm

Intention

Perceived control

Activity

Age

Prescription

\[ df = 144, r^2 = .14 \]

RMSEA=.05 (90% CI .049-.061), SRMR=.05, CFI=.98

*Significantly different from zero \((t > 1.96)\)
Discussion

This study aimed to explore the physical activity prescription behaviour of Mexican primary care physicians and the utility of the TPB in explaining this behaviour. The TPB provided useful insight into physician prescription behaviour, although not all the theory tenets were supported. We found that subjective norm was the main factor driving behavioural intention, while perceived behavioural control and physician physical activity were the only predictors of prescription behaviour. Overall, Mexican primary care physicians have a positive attitude toward prescribing physical activity, experience social pressure to prescribe it and highly intend to do it. However, they perceive a modest level of ability to prescribe physical activity and their prescription rates are low.

Similar to reports from the United States and Canada [27, 28], a third of the Mexican physicians in this study reported that they provide verbal physical activity prescriptions to their patients, while less than a third reported that they provide written prescriptions. This finding was expected given that physical activity promotion strategies have been recently introduced in primary care practice and given the barriers Mexican physicians face. Congruent with previous findings [30, 31], the main barrier reported by physicians in this study was lack of time. Public healthcare institutions in Mexico are busy and constantly overloaded with patients requiring treatment, limiting the time physicians have for preventive practices. Another barrier reported in this study was perceiving that patients were not interested in following the physical activity prescription, which has been previously identified as a barrier to prevention and exercise counselling [30, 32]. This suggests that physician beliefs about patient interests may influence their decision to prescribe physical activity and that patients in Mexico may not value physical
activity. Further, the majority of the physicians in this study did not know the physical activity prescription principles and recommendations, suggesting that those prescribing physical activity may not be doing it properly.

Given the facilitating and impeding factors that may be encountered in the execution of a behaviour, the TPB hypothesizes that perceived behavioural control can have a direct influence on behaviour [38]. This premise was supported by the present and previous findings [36]. For this sample of Mexican primary care physicians, having control over, and the skills to, prescribe physical activity seems to be the most important factor influencing their prescription behaviour. Thus, providing physicians with the skills and resources they need to prescribe physical activity represents a potential pathway for improving their physical activity prescription behaviour.

Another significant predictor of prescription behaviour in this study was physicians’ physical activity levels, which have also been shown to predict physical activity counselling behaviour [30, 33, 36]. These and previous findings [30, 33] show that physicians who are physically active are more likely to offer physical activity counselling and prescriptions, supporting the premise that physicians’ health-related behaviours impact their preventive practices towards their patients [34]. Further, it has been suggested that by engaging in physical activity, physicians can appreciate its value as a preventive measure and can become role models for their patients [33, 49]. Thus, improving Mexican physicians’ physical activity could translate into health benefits for physicians, improvements of prescription practices, and enhanced modelling of healthy behaviours for patients.
We found that physicians’ perceived behavioural control, but not intention explained prescription behaviour, while the opposite has been reported for physician encouragement of physical activity [43]. The lack of influence of intention on behaviour may be explained by a potential restriction range, which has also been observed in previous studies [41, 42]. Physicians in this and previous studies [41, 42], have reported very high intentions to perform the behaviour, resulting in reduced variability to explain behaviour. The intention-behaviour gap may also explain the lack of impact of intention upon behaviour. High intention to perform a behaviour does not always translate into action [50]. A factor that impedes this translation is the nature of the behaviour, that is, how simple or complex the behaviour is. Prescribing physical activity involves knowledge, ability, and organizational resources that physicians may have not considered when reporting their intention. This interpretation is consistent with our finding that perceived behavioural control is the most important factor influencing prescription behaviour among Mexican primary care physicians.

Regarding predictors of intention, our findings differ from studies that have examined other physician behaviours in that attitude has been typically found to have the strongest influence on intention, followed by subjective norm [41-43]. Our finding might be explained by the variable influence of each TPB construct upon behavioural intention across behaviours and situations [38]. For instance, in a study looking at physician intention for encouraging physical activity, attitude was the strongest predictor of intention, followed by subjective norm and perceived behavioural control [43]. Our findings suggest that, for this population, behaviour and context, intention is driven by
the perceived social pressure physicians experience and, to a lesser extent, by their attitude towards the behaviour.

This study showed that the TPB does not hold for this sample of Mexican physicians. Consistent with the TPB, subjective norm and perceived behavioural control explained intention and behaviour, respectively; in contrast, attitude and intention did not emerge as important factors. Although the TPB was not fully supported, these findings shed light onto potential paths for future research. Specifically, more research testing the TPB among Mexican physicians and physicians from other countries is needed to better understand physical activity prescription behaviour under different situations and contexts. Further, adaptations of the TPB could also be explored by moulding it to the culture and context in which it is being employed. Finally, other theories should be investigated (e.g. Social Cognitive Theory, Health Action Process Approach) to determine which theory better explains behaviour in the context and population of interest.

Our findings highlight the need for introducing strategies to improve the physical activity prescription rates of Mexican physicians. First, because physicians’ intention to prescribe physical activity is already high, strategies for translating intention into actual behaviour are recommended. For instance, helping physicians form implementation intentions (when, where, how) and introducing environmental cues prompting physicians to prescribe physical activity may be helpful [51]. Second, improving Mexican physicians’ perceived behavioural control to prescribe physical activity seems worthwhile. This could be done via continuing medical education courses, which are widely used in Mexico, or by introducing written resources, such as clinical guidelines or
prescription manuals, that physicians can access in their regular practice. Finally, promoting increased physical activity levels among Mexican physicians is worth pursuing. Because physicians may have limited time to exercise, programs and policies that promote physical activity within the healthcare workplace may be needed.

Some limitations to the present study should be mentioned. Behaviour was measured by physician self-report, which is prone to information bias whereby physicians may have over reported their intentions to prescribe, their prescribing practices, and their own physical activity. Further, intention and behaviour were measured at the same time and within different temporalities (i.e. present vs. future), which may also explain the lack of influence of intention upon behaviour. The cross-sectional nature of this study prevents us from making causal associations between the psychosocial constructs and physician behaviour. The representativeness of the physician sample may be limited given the sampling strategy. Further, there may be potential selection bias whereby physicians interested in physical activity may have been more likely to participate in the training. Only primary care clinics and hospitals from the Secretary of Health were included in this study; thus, these findings are only relevant to this sector of the Mexican healthcare system. Thus, findings from this study should be interpreted with caution and should be used as a starting point for future research.

**Conclusion**

Mexican primary care physicians have a positive attitude toward prescribing physical activity, experience social pressure to prescribe it and highly intend to do it. However, they perceive a modest level of ability to prescribe physical activity and their prescription rates are low. Because physicians’ perceived behavioural control to prescribe physical activity and their own physical activity levels influence this behaviour, strategies
aimed at improving these factors seem worthwhile. The problem of physical inactivity in Mexico requires immediate action and this study identified a potential area of improvement that could help strengthen efforts conducted in the Mexican healthcare setting.

Acknowledgements

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Chapter 4

The Healthcare Environment Assessment Tool (HEAT): Assessing physical activity opportunities in Mexican healthcare settings

Abstract

Background: Information about the physical activity environmental features within Mexican healthcare settings is lacking.

Methods: The Healthcare Environment Assessment Tool (HEAT) was developed and piloted, demonstrating initial face validity and inter-rater reliability (kappa=0.81). Forty healthcare settings (clinics/hospitals) from Guadalajara, representing the three Mexican healthcare systems were randomly selected. The HEAT was used to assess the presence and quality of PA enhancing features in the informational (e.g. signage), educational (e.g. pamphlets), and instrumental (e.g. stairs) environments of the selected clinics/hospitals.

Results: Twenty-eight (70%) clinics/hospitals had more than one floor with stairs, of these, 60% had elevators. Nearly 90% of stairs were visible, accessible and clean compared to fewer than 30% of elevators. Outdoors spaces favourable for PA were observed in just over half (55%) of the clinics/hospitals, and most (70%) were visible, accessible, clean, and safe. Only 25% clinics/hospitals had educational PA materials (posters and cartels).

Conclusions: The HEAT is a promising instrument to assess physical activity environmental features within healthcare settings. The physical activity instrumental environment of Mexican healthcare settings is encouraging, but the informational and educational environments could be improved. Evidence-based, low-cost and feasible strategies for promoting physical activity are discussed.
Introduction

Lack of physical activity is a major contributor to the non-communicable disease epidemic worldwide.\(^1\) In Mexico, the rates of type 2 diabetes and cardiovascular diseases are alarming\(^2,3\) and represent the principal causes of death.\(^4-6\) Despite the fact that physical activity can help reduce the risk of developing these diseases,\(^7,8\) physical activity levels among Mexican adults remain far from optimal.\(^9,10\) Because environments in which people live, learn, work and play can either promote or deter physical activity,\(^11\) attention to, and enhancement of, these environments represent a low cost, sustainable and promising strategy to promote physical activity.

Environments relevant to physical activity have been categorized into micro- (doctor’s office, home neighbourhood, workplace), meso-, exo- (direct prompts, family considerations and external social prompts/networks), and macro-environments (policies, health care systems).\(^12\) Barriers to physical activity engagement can be encountered in each of these environments. For instance, a healthcare system may not prioritize physical activity promotion policies and strategies. As a result, clinics and hospitals may not implement strategies to promote physical activity within the building or connect people with resources available in the community. Finally, a physician may not prompt/support physical activity in his/her practice (e.g. via physician counselling, written materials), meaning that patients do not receive help in changing their physical activity behaviour.

The healthcare setting is a micro-environment where both patients and employees can be reached\(^13,14\) and where physical activity can be effectively promoted.\(^15,16\) Environmental physical activity strategies relevant to the healthcare setting include informational, educational, and instrumental. Informational strategies focus on increasing
awareness about physical activity opportunities in the setting; examples include signage and floor stickers at the point of choice between stairs and elevators. These strategies have been shown to increase stair use. Educational strategies focus on teaching people about the benefits of physical activity and how to be physically active; examples include displaying posters and offering brochures or self-help materials, which can help increase regular physical activity. Instrumental strategies help make the physical environment supportive for physical activity. Features of the physical environment such as availability, accessibility, attractiveness, safety, and convenience of stairs, walking paths, and outdoor spaces can enhance physical activity. Examples of instrumental strategies include building walking paths, improving the conditions of stairs, and limiting access to elevators. These environmental strategies can lead to increases in physical activity within the setting.

Strategies for promoting physical activity within the healthcare environment have been implemented in the United States, Canada and Europe. Information about the Mexican healthcare physical activity environment is lacking, and whether similar strategies have been implemented within the Mexican healthcare system is unknown. The Mexican healthcare system is comprised of three sub-systems: the National Institutes for Social Security, the Secretary of Health, and the private sector. The insured seek healthcare within the National Institutes for Social Security (50%), while the uninsured seek healthcare within the Secretary of Health (45%) and the private sector (5%). Because Mexican patients see healthcare settings as the place to receive health-related information, and given that Mexican healthcare workers have been found to be
insufficiently active,\textsuperscript{31,32} both patients and healthcare workers could benefit from improved physical activity opportunities within the healthcare setting.

In order to design environmental strategies for promoting physical activity within Mexican healthcare settings, it is necessary to assess and document the current features of this micro-environment. However, existing tools for measuring physical activity micro-environments\textsuperscript{33-35} are not specific to the healthcare setting; currently there are no tools available to measure the physical activity healthcare environment. Evidence suggests that features in the micro-environments can influence physical activity.\textsuperscript{16-18,22,24,25} To further explore this link within healthcare settings, it is important to develop tools for assessing the factors that may influence physical activity. The purpose of this study was twofold. First, we aimed to develop a tool for measuring the physical activity informational, educational, and instrumental environments within healthcare settings. A second purpose was to assess and compare these environments among the three Mexican healthcare subsystems for their potential to promote physical activity.

\textbf{Method}

\textbf{Design and Sample}

This study developed and pilot tested a new instrument to measure the physical activity environment in health care settings, the Healthcare Environment Assessment Tool (HEAT). The HEAT was pilot tested in primary care clinics and hospitals (clinics/hospitals) from Guadalajara, the second largest city in Mexico.\textsuperscript{36} Using systematic random sampling, 50 clinics/hospitals were selected from a list provided by the Jalisco Secretary of Health that contained the names and addresses of all
clinics/hospitals in Guadalajara (N=263). The selection of clinics/hospitals was stratified by healthcare subsystem. The proportion of clinics/hospitals selected from each subsystem was based on the proportion of patients attending each: 50% social security clinics, 45% secretary of health clinics and 5% private clinics. Eligible clinics/hospitals were those on the list with a valid address located in the city of Guadalajara. The data were collected in the spring of 2012 and analyzed in the summer of that year.

**Healthcare Environment Assessment Tool (HEAT)**

The HEAT was developed to measure the physical activity informational, educational, and instrumental environments in the healthcare setting via direct observation (see tool in Appendix). This tool aims to identify environmental attributes that have been shown to influence physical activity in other micro-environments. The HEAT builds on an observational checklist used in a previous study\(^\text{37}\) to assess the educational environment in a healthcare context, and is informed by elements outlined in the New York Active Design Guidelines\(^\text{38}\) to assess the informational and instrumental environments. The HEAT was developed and pilot-tested over a three-month period. First, experts in the physical activity built environment field (n=4) from Mexico, Canada and the United States met to develop the first draft of the HEAT. During an initial meeting, the items to be included in the HEAT were selected. Second, the first draft of the HEAT was employed to assess one clinic; after this, experts met again to discuss the assessment and to revise the tool. The revised HEAT was tested again where two trained raters independently assessed four different clinics/hospitals. The inter-rater reliability achieved was \(kappa = 0.81\), which is considered to be substantial agreement.\(^\text{39}\) The initial face validity of the tool was established in a final meeting where the team of experts
examined, edited, and reached consensus on items to be included in the tool. To pilot the final draft of the HEAT, the selected clinics/hospitals were assessed by a single rater.

The HEAT is divided into two sections; one focuses on assessing the instrumental and informational environments and a second focuses on assessing the educational environment of the healthcare setting. For the instrumental and informational environments, the HEAT assesses the presence of indoor vertical travel opportunities (e.g. stairs, elevators) and outdoor recreation opportunities (present=1; not present=0). The quality of these areas is then assessed according to the following criteria: available, accessible, visible, clean, safe, and accompanied by signage (yes=1; no=0). The educational environment is assessed by documenting the availability (available=1; unavailable=0) of printed materials such as posters, brochures, leaflets, flyers, magazine articles, and cartels (hand-made posters) about physical activity. Message framing, the emphasis of a message on the benefits of adopting (gain framed) or the costs of failing to adopt (loss frame) a behaviour, can be used in educational materials. Gain framed messages can optimize the persuasiveness of physical activity messages and have been shown to be more effective for the promotion of physical activity intentions and behaviour, than loss frame messages. Thus, the content (i.e. what information was presented) and message frame (i.e. gain/loss frame) of these educational materials is also recorded in the HEAT. Level of care (primary, secondary, and tertiary), number of floors, and type of healthcare subsystem of the clinic/hospital assessed is also recorded in the HEAT. An accompanying HEAT manual includes operational definitions for each of the assessment criteria in the tool as well as detailed instructions on how to conduct the assessment (see Table 1 for operational definitions).
Assessment Protocol

The HEAT assessment was conducted by the first author following instructions outlined in the manual. The availability, visibility, accessibility and signage of the instrumental and informational environments were assessed while standing at an ideal vantage point (e.g. clinic/hospital entrance). The cleanliness, usage, and safety of these areas, were assessed by walking through them. The educational environment of two high-traffic areas (i.e. the lobby and one waiting room) was assessed in each clinic/hospital. All visible physical activity-related posters, magazine articles, cartels, brochures, leaflets and flyers were assessed. To be included, these materials needed to contain at least one sentence about physical activity health benefits, or physical activity recommendations, or advice about ways to be physically active. The researcher left the clinic/hospital when the assessment was completed.

Statistical Analyses

Frequency counts were used to estimate proportions of the informational, educational, and instrumental environmental indicators present. Fisher’s exact tests were conducted to gauge associations between type of healthcare subsystem and level of care with the availability of educational and instrumental environment features. The overall statistical significance was set at $p<.05$, and the Bonferroni correction method was used. Analyses were conducted using the Statistical Package for Social Sciences version 18 for Windows (IBM, Armonk NY).
Table 1. Operational definitions of HEAT items.

<table>
<thead>
<tr>
<th>Item</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Available</td>
<td>Present in the clinic/hospital</td>
</tr>
<tr>
<td>Visible</td>
<td>Highly visible from either the clinic/hospital’s entrance or principal path of travel</td>
</tr>
<tr>
<td>Accessible</td>
<td>Direct access from either the clinic/hospital’s entrance or principal path of travel</td>
</tr>
<tr>
<td>Signage</td>
<td>Visible and clear signs in the clinic/hospital that accurately direct you to the stair/elevator</td>
</tr>
<tr>
<td>Usage</td>
<td>The principal means for vertical travel within the clinic/hospital</td>
</tr>
<tr>
<td>Clean</td>
<td>Free of garbage, graffiti and well painted</td>
</tr>
<tr>
<td>Safe</td>
<td>• Stairs: slip-resistant floor, with handrails and wide enough to accommodate two people</td>
</tr>
<tr>
<td></td>
<td>• Elevators: signs of lift capacity, earthquake or fire safety, door reopening button and emergency alarm/telephone</td>
</tr>
<tr>
<td></td>
<td>• Green space: free of glass, with good visibility and good paving conditions</td>
</tr>
<tr>
<td>Gain-framed messages</td>
<td>A message that is focused on the benefits of adopting physical activity (e.g. If you are physically active, you will live longer)</td>
</tr>
<tr>
<td>Loss-gained messages</td>
<td>A message that is focused on the costs of not adopting the behaviour (e.g. Physical inactivity can lead to cardiovascular diseases)</td>
</tr>
<tr>
<td>Written materials</td>
<td>Any printed resources (posters, brochures, leaflets, flyers, magazine articles, and cartels) that contain at least one sentence about physical activity health benefits, or physical activity recommendations, or advice about ways to be physically active.</td>
</tr>
</tbody>
</table>
Results

From the original 50 randomly selected clinics/hospitals, 40 were found at the anticipated address and included in the study. There were 15 (37%) clinics/hospitals from the Secretary of Health, 14 (35%) from the Social Security Institutes, and 11 (28%) from the private sector (see Table 2).

**Informational Environment.** From the stairs assessed \((n=28)\), 7% had signs indicating their location, and none had signs prompting their use. Similarly, from the elevators assessed \((n=17)\), 12% had signs about their location. There were no signs indicating outdoor space locations or promoting their use (see Table 2). No significant associations between indicators of the informational environment with level of care or healthcare subsystem type were found.

Table 2. Descriptive characteristics of the informational, instrumental, and educational environments of the clinics and hospitals included by health care system \((N=40)\).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Secretary of Health (n = 15)</th>
<th>Social Security Institutes (n = 14)</th>
<th>Private Clinics (n = 11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of care (n (%))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>10 (67)</td>
<td>8 (57)</td>
<td>2 (18)</td>
</tr>
<tr>
<td>Secondary</td>
<td>0</td>
<td>5 (36)</td>
<td>8 (73)</td>
</tr>
<tr>
<td>Tertiary</td>
<td>5 (33)</td>
<td>1 (7)</td>
<td>1 (9)</td>
</tr>
<tr>
<td>Stairs available (n (%))</td>
<td>7 (47)</td>
<td>13 (93)*</td>
<td>10 (91)</td>
</tr>
<tr>
<td>Stair signage (n (%))</td>
<td>0</td>
<td>1 (7)</td>
<td>1 (9)</td>
</tr>
<tr>
<td>Elevators available (n (%))</td>
<td>2 (13)</td>
<td>12 (86)*</td>
<td>3 (27)</td>
</tr>
<tr>
<td>Elevator signage (n (%))</td>
<td>2 (13)</td>
<td>10 (71)</td>
<td>3 (27)</td>
</tr>
<tr>
<td>Outdoor spaces (n (%))</td>
<td>10 (67)</td>
<td>8 (57)</td>
<td>4 (36)</td>
</tr>
<tr>
<td>Outdoor space signage (n (%))</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Educational materials (n (%))</td>
<td>8 (53)</td>
<td>2 (14)</td>
<td>0</td>
</tr>
</tbody>
</table>

*Significant association with presence of stairs and elevators \((p < .01)\).
Educational Environment. From the clinics/hospitals assessed (n=40), 25% had educational physical activity materials, all of which were primary care clinics from either the Secretary of Health or the Social Security Institutes (see Table 2). The only physical activity related educational materials available were posters and cartels. The same generic poster about health promotion that included a single sentence prompting healthcare workers to promote patient physical activity was available in eight primary care clinics from the Secretary of Health. Cartels were available in two primary care clinics from the Social Security Institutes. These cartels contained detailed information about physical activity benefits and recommendations for patients (see cartel example in Figure 1). The physical activity messages in all posters and cartels were gain framed, that is, focused on the benefits of adopting physical activity. There were no significant associations with healthcare subsystem type or level of care.

Figure 1. Example of a cartel found in one primary care clinic.
**Instrumental Environment.** From the clinics/hospitals assessed (n=40), 70% had more than one floor with stairs. Of these multistory clinics/hospitals (n=28), 60% had elevators. Regarding quality all of the assessed stairs (n=28), all were safe, meaning that they had slip-resistant floor, handrails and could fit two people. Nearly 90% of the stairs were accessible, clean and the principal means for vertical travel. About the same proportion of stairs (57%) and elevators (65%) were visible from either the clinic/hospital’s entrance or principal path of travel. Only about a third of the assessed elevators were the principal means of vertical travel, and less than these were accessible, clean and safe (see Table 3). A significant association between the opportunity for vertical travel by stairs or elevators with healthcare subsystem type was observed, with more Social Security institutions including these features (p<.05).

Outdoors, gardens and paved terraces were observed in over half (55%) of the assessed clinics/hospitals. Of the 22 outdoor spaces inventoried, more than 70% were visible, accessible, clean and safe, and 30% had walking trails (see Table 3). The outdoor recreation spaces available in the clinics/hospitals were grassed gardens and paved terraces with no physical activity specific features (e.g. equipment, floor painting).

Table 3. Physical activity characteristics of the areas assessed within clinics/hospitals.

<table>
<thead>
<tr>
<th>Instrumental environment criteria</th>
<th>Stairs n=28</th>
<th>Elevators n=17</th>
<th>Outdoor spaces n=22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visible (n (%))</td>
<td>16 (57)</td>
<td>11 (65)</td>
<td>16 (73)</td>
</tr>
<tr>
<td>Accessible (n (%))</td>
<td>25 (89)</td>
<td>3 (18)</td>
<td>16 (73)</td>
</tr>
<tr>
<td>Principal means of vertical travel (n (%))</td>
<td>23 (82)</td>
<td>5 (29)</td>
<td>NA</td>
</tr>
<tr>
<td>Clean (n (%))</td>
<td>27 (96)</td>
<td>2 (12)</td>
<td>18 (82)</td>
</tr>
<tr>
<td>Safe (n (%))</td>
<td>28 (100)</td>
<td>1 (6)</td>
<td>19 (86)</td>
</tr>
<tr>
<td>Walking trail (n (%))</td>
<td>NA</td>
<td>NA</td>
<td>6 (27)</td>
</tr>
</tbody>
</table>

NA = not applicable
Discussion

In this study, the HEAT instrument was pilot tested and found to be a promising and feasible tool to systematically assess the availability and quality of environmental features hypothesized to influence physical activity within healthcare settings. Using the HEAT, we found that the physical activity instrumental environment of Mexican healthcare settings is encouraging, but the informational and educational environments could be improved.

This is the first study to examine the physical activity environment in healthcare settings within the context of a middle-income country. Overall, the instrumental environment in the assessed clinics/hospitals included some encouraging features, namely stairs and outdoor spaces. The majority of the stairs and outdoor spaces available were of good quality (accessible, clean and safe), although around half of the stairs were not visible from the entrance or principal path of travel. The informational and educational environments were poor. Signs indicating stair location were seldom present and nonexistent for outdoor spaces. Few posters and cartels were observed only in primary care clinics but the physical activity information presented was insufficient.

The present findings suggest that there is room for improving the informational and educational environments within the Mexican healthcare context. Existing evidence may provide insight into promising, simple, and low cost strategies to enhance physical activity opportunities within Mexican healthcare settings. For example, given that stairs are already available and accessible in many Mexican clinics and hospitals,
encouraging stair use represents a feasible strategy for promoting physical activity among healthcare professionals and patients. It has been shown that relatively modest increases in stair use can have positive fitness effects in healthcare professionals. Effective strategies for promoting stair use include the use of signs indicating stair location, the use of posters and floor stickers to promote stair use and making physical improvements to existing stairs to enhance safety and aesthetic appeal.

Although findings show that elevators were less accessible and less frequently used for vertical travel compared to stairs, when they were present, they were highly visible. Given that evidence shows that the presence of elevators deters stair use, strategies for promoting the use of the stairs over the elevators may be warranted. Evidence-based strategies include having fewer elevators working in the building (e.g. three out of four) or programming elevators to only stop on every other floor.

Within workplaces, the availability of recreational areas such as outdoor spaces, fitness facilities, and walking paths promotes physical activity. In this study, half of the hospitals and clinics had an outdoor recreation space; however, the quality of these was poor, there were no signs indicating location, and few had a walking path. It has been suggested that by improving the accessibility and the visibility of outdoor spaces from the main building circulation system, the use of these spaces might improve. Further, the inclusion of a walking path has the potential to increase physical activity. Thus, building a walking path where none exists, or improving access to, and conditions
of, existing outdoor spaces represent additional ways in which to enhance the physical activity opportunities in Mexican healthcare settings.

In this study, only primary care clinics from public institutions had educational physical activity materials (i.e. posters and cartels). This is not surprising given that most preventive and health promotion strategies are implemented in primary care. Although posters were available in some clinics, the information they contained about physical activity was minimal (i.e. a single sentence in the poster) and directed at patients. Cartels were more encouraging as they had more information about physical activity benefits and recommendations and used gain-framed messages. However, cartels were present in only two primary care clinics and were directed at patients.

Promoting physical activity among healthcare professionals has the potential to not only improve their own health, but also their health promotion practices towards patients. For instance, physically active Mexican primary care physicians are more likely to prescribe physical activity to their patients. The use of posters for promoting physical activity in hospitals has been shown to increase stair use among healthcare workers, and the use of motivational brochures and self-help materials delivered in the workplace have been shown to promote weekly physical activity among employees. Further, it has been suggested that tailored messages, gain-framed messages, and self-efficacy change messages are promising formulations of physical activity messages. Employing health promotion cartels is a simple and low cost strategy that some Mexican clinics are already
implementing and which could easily be transferred to other clinics and hospitals across Mexico, including patients and healthcare professionals as an audience for the messages.

Although attention to the physical activity-promoting qualities of several micro-environments has increased, a limited number of tools for measuring these environments have been developed. Because existing tools\textsuperscript{33,34} are not specific to physical activity behaviour or to the healthcare environment, the HEAT was developed. This is the first tool focused on measuring the physical activity environment specific to the healthcare setting. Although the HEAT was developed within the context of Mexico, it can be easily adapted to fit the characteristics of other healthcare contexts. In this pilot test of the HEAT, the tool was found to have face validity and good inter-rater reliability. The test-retest reliability as well as the predictive validity of the HEAT are yet to be established. The HEAT offers a promising tool for measuring the physical activity environment within healthcare settings and for linking it to physical activity behaviours or intervention effects. This study provides preliminary evidence of the usefulness of the tool, but further testing and refinement of the tool are needed.

**Limitations**

This was a descriptive study where no causal relations were examined; thus, findings from this study should be considered to provide only a snapshot of the existing healthcare environment in Guadalajara, Mexico. Another limitation was that physical activity behaviours of patients and healthcare professionals were not measured, which prevents us from linking the Mexican healthcare environment features with physical
activity behaviour. The test-retest reliability and the predictive validity of the tool were not established which limits conclusions about the reliability of the tool. The availability and accessibility of physical activity-related equipment/facilities (e.g. lockers, bike racks, gyms) were not measured, a limitation that will be addressed in future studies using the HEAT. Finally, given that the time of the day when the assessment was conducted varied across clinics/hospitals and that the number of stair/elevator users was not recorded, conclusions about vertical travel by stairs should be interpreted cautiously.

Conclusion

This pilot study showed that the HEAT is a promising instrument to assess physical activity environmental features within healthcare settings. The HEAT showed that the physical activity instrumental environment of Mexican healthcare settings is encouraging. However, there is room for improvement as informational and educational strategies that inform patients and healthcare professionals about what they need to do and how they can be physically active are lacking. The infrastructure to increase opportunities to be physically active within the healthcare settings, which is the most expensive feature to intervene on, is in place. Evidence-based, cost-effective, and feasible strategies that focus on promoting the use of such infrastructure are available and could be implemented on a wide scale across Mexican healthcare settings. Physical activity should be promoted in every environment in which people live, play and work, and the healthcare setting is a particularly important place in which physical activity should be promoted.
References


Chapter 5

Training Physicians on Physical Activity Counselling: A RE-AIM Evaluation

Authors: Galaviz KI, Jáuregui E, Janssen I, Estabrooks PA, Lee ER, Ortiz L, Lopez y Taylor J, and Lévesque L.
Abstract

Purpose: to evaluate the Reach, Effectiveness, Adoption, Implementation and Maintenance of a physical activity (PA) counselling training course for Mexican physicians.

Intervention: A three-hour PA counselling training course framed on the theory of planned behaviour (TPB) was implemented by the Secretary of Health across the 13 sanitary regions in the state of Jalisco, Mexico.

Methods: The RE-AIM framework guided this evaluation. For Reach and Effectiveness, consenting physicians completed a questionnaire gathering demographic information and measuring their PA counselling practices, the tenets of the TPB and their PA behaviour. Adoption and Implementation of the training strategy were measured via structured telephone interviews and training site observations. Maintenance was assessed by determining the long term training effects and the sustainability of the strategy.

Results: 305 primary care physicians (52% women) participated. Significant improvements were observed on physician perceived behavioural control, intention, and knowledge for PA counselling at training completion ($p<.001$). The training was adopted by all sanitary regions in Jalisco and consistently implemented, although with duration variability, costing $429 Mexican pesos per session. Significant improvements on physician PA counselling score were observed three to six months after the training ($p<.001$, $d=.73$). Perceived behavioural control was the only psychosocial factor explaining physician counselling practices ($r^2 = .11$, $p<.001$).

Conclusion: This training strategy is a low cost, feasible and promising strategy for improving PA counselling practices among Mexican physicians.
**Introduction**

Physical inactivity is the fourth leading cause of death worldwide [1]. Physical inactivity is associated with the development of major non-cummmunicable diseases (NCDs) such as type 2 diabetes, coronary heart disease, breast cancer and colon cancer [2]. In Mexico, inactivity estimates range from 17% to 38% [3, 4] and cardiovascular disease and diabetes represent the principal causes of death [5-7]. Physical inactivity has been recognized as a pandemic that will particularly affect low- and middle-income countries in the years to come [8]. Thus, low-cost, sustainable strategies that impact a large sector of the population are needed for improving physical activity among the Mexican population.

Evidence suggests that the primary care setting constitutes an appropriate context in which to promote physical activity [9, 10]. A high proportion of inactive patients can be effectively reached in these settings [11], where they are likely to be receptive to health advice [9]. Because patients identify primary care physicians as a preferred source of advice for physical activity [10], physicians are in an ideal position to promote physical activity. Several physician-delivered strategies have been implemented in primary care settings. A meta-analysis shows that physician physical activity counselling and prescription can improve patient physical activity, with some sustainable changes for up to 12 months [12]. Emerging evidence supports the use of multi-component interventions that combine physical activity counselling, prescription and referral strategies to community-based resources [13, 14]. Incorporating physical activity promotion strategies into primary care practice has been found to be feasible and cost-effective [15-17].
The proportion of Mexican physicians implementing physical activity counselling practices (i.e. verbal advice, written prescription and referral) is low, ranging from 6% for writing prescriptions, 8% for referring patients to community resources to 33% for providing verbal advice [18]. Mexican primary care physicians report they do not have time nor sufficient knowledge to prescribe physical activity [18], which may explain these low rates. The result of this situation is that Mexican patients are not receiving evidence-based, physical activity preventive strategies that can significantly reduce their risk of NCDs.

Training and education are the most used strategies to promote evidence-based practice among clinicians [19]; theory-driven approaches to influence physician practice have been recommended [20, 21]. Physician training strategies implemented in the United States, Finland and Argentina have been shown to improve physician self-efficacy for physical activity counselling, physical activity counselling and prescription rates, and improvements to patients’ cardiovascular health [22-25]. Regarding theoretical frameworks, the Theory of Planned Behaviour (TPB) [26] has been identified as a preferred model for influencing physician practice [20, 21]. The TPB has been shown to explain physician encouragement of physical activity [27] and prescription of physical activity among Mexican primary care physicians [18].

In México, the Jalisco Secretary of Health has been implementing yearly training courses for primary care physicians on the prevention and treatment of NCDs since 1999. Training courses have been focused on diabetes management, cardiovascular risk, obesity, aging, and preventive medicine. Recognizing the importance of physical activity counselling in primary care, the Jalisco Secretary of Health introduced a physical activity
counselling training course in 2012. In order to inform future decisions by the Secretary of Health stakeholders about the effectiveness, replicability and sustainability of the training course, it is critical to understand how the training course was implemented across Jalisco, under what conditions it might be working, and who might be benefitting. Therefore, the purpose of this study was to evaluate the Reach, Effectiveness, Adoption, Implementation and Maintenance of the physical activity counselling training course implemented by the Jalisco Secretary of Health.

Method

Training Course and Knowledge Tool

The 5-As (Assess, Advise, Assist, Agree and Arrange) model was developed to assist physicians in their lifestyle counselling practice. This model has been widely employed for physical activity counselling and has been shown to be an effective tool for promoting physician physical activity counselling and patient physical activity [28]. The training was focused on teaching physicians how to employ the 5-As model and was framed on the TPB to promote the uptake of this evidence-based tool in clinical practice. Using the 5-As model, the training focused on teaching physicians how to provide verbal advice, written prescriptions and how to refer patients to physical activity resources. Physicians were also taught the Frequency, Intensity, Type and Time (FITT) principle and the International Physical Activity Guidelines [29] for physical activity prescription. The behaviour change strategies employed in the training course were informed by a taxonomy of strategies previously developed [30].

The training was developed to be three hours in length and to include the following modules: 1) the benefits and effectiveness of physical activity counselling,
which focuses on changing physician attitudes; 2) physical activity counselling in México and the world, which focuses on influencing subjective norm; 3) introduction to the 5-As model, the FITT principles and the Physical Activity Guidelines, which focuses on influencing perceived behavioural control; and 4) physical activity counselling practice, which focuses on enhancing perceived behavioural control. Power point presentations, group discussions and role-playing were developed (see training course outline in Appendix). A Secretary of Health expert with a doctoral degree and with expertise in physical activity counselling delivered all training sessions across Jalisco.

**Sampling and Participants**

Healthcare institutions from the federal Secretary of Health provide healthcare to approximately 45% of the Mexican population [31]. In Jalisco, the Secretary of Health provides healthcare services across 13 sanitary regions, which group 125 municipalities according to geographical area. Primary care physicians in Jalisco (N=1,904) are trained in general medicine and are mostly male (59%).

The coordinators of each sanitary region (n=13) selected and sent 322 primary care physicians to one of 13 training courses (i.e., one per sanitary region) on physical activity counselling held from January-March 2013. Eligible study participants were male and female physicians of any age working in primary care clinics from the Secretary of Health with no previous training on physical activity counselling. Physicians attending the training course were invited to participate in the study at the beginning of the training course via announcements made by the Secretary of Health expert delivering the training. Physicians provided informed consent and completed the baseline questionnaire. This
study was approved by the Ethics Research Boards from Queen’s University and the Secretary of Health.

**Evaluation Framework**

The RE-AIM framework [32-34] informed the evaluation of the physician training course. This framework outlines internal and external validity factors that should be considered in the design, implementation and evaluation of interventions to promote their translation into clinical practice. RE-AIM provides a framework for determining which programs work under real-world conditions and which can be sustained. The framework includes the assessment of: Reach (i.e., representativeness of participants), Effectiveness (i.e., intervention impact), Adoption (i.e., representativeness of settings and delivery agents), Implementation (i.e., intervention fidelity), and Maintenance (i.e., individual and organizational level long term impact) [32]. The Reach and Effectiveness dimensions assess individual-level outcomes, while the Adoption and Implementation dimensions measure organization-level outcomes. The Maintenance dimension measures both, individual- and organization-level outcomes.

**Reach Measures**

To determine representativeness of participants, demographic information such as sex, age, years of practice, type of practice (rural/urban) and medical specialty was collected and the percentage of eligible physicians who took part in the study was calculated. Because physical activity behaviour influences physician physical activity counselling practices [18, 35], physician physical activity was also measured using Godin’s Leisure Time Exercise Questionnaire [36]. The GLTEQ reliability ($r = .74$) and
validity ($r = .56$ with maximum oxygen consumption) have been established in adults [36].

**Effectiveness Measures**

To assess the short-term impact of the training course, physical activity counselling practices were measured using four items from the National Family Physician Workforce Survey of Canada [37]. These items measure the frequency with which physicians: 1) ask patients about their physical activity, 2) offer verbal advice, 3) offer written prescription, and 4) refer patients to physical activity resources. Answers were anchored on a five-point scale ranging from Never=1 to Always=5. Scores were summed to create a composite Counselling Score to be used in the analyses.

Physicians were also asked to identify from a list, the barriers to physical activity counselling they experience in their own practice. Physician physical activity prescription knowledge was measured using three items where answers were dichotomous (Yes/No) and open-ended. Physicians were asked if they knew about: the International Physical Activity Guidelines, FITT principle for prescribing physical activity, and the different physical activity intensities. If they answered yes, they were asked to describe each of these concepts.

An adapted version of a validated TPB questionnaire [38] was employed to measure the psychosocial constructs hypothesized to influence physical activity counselling practices. This questionnaire has been translated into the Spanish language for a previous physician study in Mexico and has been shown to be reliable [18]. The questionnaire has four scales, each measuring one construct of the TPB, with answers positioned on a seven-point Likert scale. Physicians’ attitude toward physical activity
counselling was measured with four items (e.g. I think that physical activity counselling is generally: 1=useful to 7=not useful); intention to counsel about physical activity was measured with three items (e.g. I intend to counsel my patients on physical activity within the next six months: 1=strongly agree to 7=strongly disagree); subjective norm was measured with four items (e.g. Most general practitioners would offer physical activity counselling: 1=strongly agree to 7=strongly disagree); and perceived behavioural control was measured with five items (e.g. Counselling my patients on physical activity is: 1=very easy to 7=very difficult). Items were reverse coded for the data analysis. The mean for each scale was used as an indicator of each construct, with higher numbers representing better outcomes. An average internal consistency of \( \alpha = .87 \) for the four scales has been reported for the English language [38] and \( \alpha = .80 \) for the Spanish language [18]. In this study, the average internal consistency observed for the four scales was \( \alpha = .84 \).

The study questionnaire including these measures was completed by physicians on location, before and at the end of the training session. Three to six months after the training, the same questionnaire was sent to physicians via email or by air mail.

**Adoption Measures**

To determine representativeness of Sanitary Regions, adoption was evaluated by comparing the number of sanitary regions of Jalisco that were offered the training against the number of regions that received the training. The coordinators from each sanitary region in Jalisco were contacted by telephone to ascertain if a training course was implemented in their region and how the selection of physicians to send to the training was conducted. Respondents were also asked how and from whom they found out about
the training, which selection criteria were used, how they invited physicians, and their opinion on integrating continuing medical education in their regular activities.

**Implementation Measures**

To assess training fidelity, a process evaluation was conducted on three domains: quantity of training delivered (dose), extent to which the training was implemented as intended (fidelity) and overall calibre of the training (quality). These were assessed via direct observations using checklists specifically developed for this study. The Secretary of Health trainer completed a checklist about training fidelity (ratio of actual content delivered relative to content modified/omitted from the original implementation plan) and training quality (1 to 5 rating of perceived successfulness of delivery of the training). A trained observer used as similar checklist to record dose delivered (duration of training session and modules, number of topics presented), and quality of the training. Training cost was determined by documenting all human and material resources used to implement the 13 training sessions.

**Maintenance Measures**

Maintenance was evaluated from two perspectives; training effects on physician physical activity counselling practices and maintenance of the training course. The effects of the training course were evaluated by comparing physician counselling practices and psychosocial factors at baseline with physician outcomes three to six months after the training. Maintenance of the training was evaluated by determining if the training course aligned with the mission of the Secretary of Health, if the course was institutionalized and if it continued to be implemented after the spring of 2013.
Analysis

Descriptive statistics were computed. Chi square tests were used to examine associations among demographic variables. Wilcoxon’s signed test for paired samples was used to assess changes in physicians’ psychosocial variables. Paired samples t-tests were computed to assess changes in physicians’ Counselling Scores. A multiple regression analysis using the backward method was employed to gauge the influence of the TPB constructs and knowledge variables on physical activity counselling practices. The overall statistical significance was set at $\alpha=.05$ and the Bonferroni correction method was employed. The analyses were conducted with the Statistical Package for Social Sciences version 18 for windows. The region coordinator data were analyzed by computing frequencies for close-ended questions, and by conducting inductive content analysis [39] for open-ended questions.

Results

Reach and Sample Characteristics

From the 322 physicians attending the training course, 305 from 119 municipalities representing the 13 sanitary regions agreed to participate in the study. Similar to the primary care physician population in Jalisco, most of physicians in this study had a general medicine specialty (92%), but female physicians (52%) were over represented. Physicians who declined participation ($n=17$) were mostly male (59%) from urban clinics (65%). Physician demographic characteristics are presented in Table 1.

At baseline (i.e., before the training session), 42% of physicians reported that they usually ask patients about their physical activity levels, 44% that they usually provide verbal physical activity advice, 10% that they usually provide written physical activity
Female physicians reported asking patients about their physical activity levels slightly more frequently than male physicians (mean 4.4 vs. 4.2, \( p < .05 \)). More than three quarters of physicians (77%) were classified as physically active; active physicians reported offering written physical activity prescriptions slightly more frequently than inactive physicians (mean 2.4 vs. 2.0, \( p < .05 \)). Rural physicians reported referring their patients to physical activity resources slightly more frequently than urban physicians (mean 2.4 vs. 1.9, \( p < .01 \)).

The main barriers to providing physical activity counselling were not knowing how to counsel (53%), perceiving that patients do not follow the advice (27%), and not having time to counsel (18%). Regarding knowledge, 16% of physicians reported knowing the different physical activity intensities, 8% the FITT principle, and 4% the international physical activity guidelines. However, most of the descriptions of these concepts physicians included on their questionnaire were incorrect.

Physicians reported having a positive attitude towards physical activity counselling, experienced social pressure to counsel and had high intentions to counsel on physical activity; however, they perceived a modest level of ability to counsel (see Table 1). Around 77% \( (r^2 = .77, p < .001) \) of the variance in behavioural intention was explained by the TPB constructs, where attitudes \( (\beta = .62, p < .001) \), subjective norm \( (\beta = .16, p < .001) \) and perceived behavioural control \( (\beta = .23, p < .001) \) were all significant predictors of intention. A regression model with perceived behavioural control and intention baseline scores as predictors explained a small proportion of the variance in baseline Counselling
Score ($r^2 = 0.03, p<0.05$), where perceived behavioural control was the only significant predictor ($\beta = 0.22, p<0.01$).

Table 1. Descriptive characteristics of the sample at baseline (N=305).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean ± SD/Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demographics</strong></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>40 ± 11</td>
</tr>
<tr>
<td>Women</td>
<td>52%</td>
</tr>
<tr>
<td>Rural</td>
<td>54%</td>
</tr>
<tr>
<td>General medicine</td>
<td>92%</td>
</tr>
<tr>
<td>Years of practice</td>
<td>13 ± 9</td>
</tr>
<tr>
<td><strong>Counselling practices (mean ± SD)</strong></td>
<td></td>
</tr>
<tr>
<td>Ask about PA</td>
<td>4.3 ± 0.7</td>
</tr>
<tr>
<td>Provide PA verbal advice</td>
<td>3.9 ± 0.9</td>
</tr>
<tr>
<td>Provide PA written prescription</td>
<td>2.3 ± 1.1</td>
</tr>
<tr>
<td>Refer patients</td>
<td>2.1 ± 1.2</td>
</tr>
<tr>
<td><strong>Counselling knowledge (n (%))</strong></td>
<td></td>
</tr>
<tr>
<td>Know the PA guidelines</td>
<td>4%</td>
</tr>
<tr>
<td>Know the FITT principle</td>
<td>8%</td>
</tr>
<tr>
<td>Know the PA intensities</td>
<td>16%</td>
</tr>
<tr>
<td><strong>Physical activity</strong></td>
<td></td>
</tr>
<tr>
<td>Godin PA score (mean ± SD)</td>
<td>106 ± 67</td>
</tr>
<tr>
<td>Active physicians (n (%))</td>
<td>77%</td>
</tr>
<tr>
<td><strong>Psychosocial constructs (mean ± SD)</strong></td>
<td></td>
</tr>
<tr>
<td>Attitudes towards counselling</td>
<td>6.5 ± 1.2</td>
</tr>
<tr>
<td>Subjective norm</td>
<td>5.8 ± 1.3</td>
</tr>
<tr>
<td>Perceived behavioural control for</td>
<td>5.2 ± 1.3</td>
</tr>
<tr>
<td>counselling</td>
<td>6.2 ± 1.4</td>
</tr>
<tr>
<td>Intention to counsel</td>
<td></td>
</tr>
</tbody>
</table>

*a* Measured on a 5-point scale ranging from 1=Never to 5=Always  
*b* Computed using the questionnaire’s calculation methods  
*c* Measured on a 7-point scale ranging from 1=Low to 7=High  
PA = Physical Activity; SD = standard deviation

**Effectiveness**

The effectiveness of the training intervention was evaluated in the short term (i.e. pre-post training comparison). All the physicians who completed the baseline
questionnaire (N=305) also completed the post-training questionnaire. Regarding knowledge, there was a significant increase in the proportion of physicians reporting that they know the physical activity guidelines (4% vs. 77%, \( p < .001 \)), the FITT principle (8% vs. 88%, \( p < .001 \)) and the different physical activity intensities (16% vs. 92%, \( p < .001 \)).

Regarding the TPB, significant increases were observed on all the theory constructs (see Table 2). By computing the difference between pre and post scores for every physician, we found that attitude scores increased for 21% of physicians, subjective norm scores increased for 39% of physicians, perceived behavioural control scores increased for 40% of physicians and intention scores increased for 28% of physicians. Scores did not change or decrease for the rest of the physicians.

Table 2. Changes in outcome variables from baseline to post training and at 3-6 months.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Baseline N=305</th>
<th>Post-training N=305</th>
<th>3-6 months N=186</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge (n (%))</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Know the PA guidelines</td>
<td>12 (4)</td>
<td>234 (77)*</td>
<td>88 (47)*</td>
<td>Phi = .11</td>
</tr>
<tr>
<td>Know the FITT principle</td>
<td>26 (8)</td>
<td>269 (88)*</td>
<td>148 (80)*</td>
<td>Phi = .06</td>
</tr>
<tr>
<td>Know the PA intensities</td>
<td>49 (16)</td>
<td>282 (92)*</td>
<td>120 (64)*</td>
<td>Phi = .05</td>
</tr>
<tr>
<td>Psychosocial(^a) constructs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(median ± IQR)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude</td>
<td>7.0 ± 0.1</td>
<td>7.0 ± 0*</td>
<td>7.0 ± 0</td>
<td>( r = .36 )</td>
</tr>
<tr>
<td>Subjective norm</td>
<td>6.0 ± 1.7</td>
<td>6.7 ± 1.2*</td>
<td>6.3 ± 1.7</td>
<td>( r = .46 )</td>
</tr>
<tr>
<td>Perceived behavioural control</td>
<td>5.4 ± 1.6</td>
<td>5.8 ± 1.8*</td>
<td>5.6 ± 1.6</td>
<td>( r = .34 )</td>
</tr>
<tr>
<td>Intention</td>
<td>6.8 ± 1.0</td>
<td>6.8 ± 0.4*</td>
<td>6.8 ± 1.0</td>
<td>( r = .26 )</td>
</tr>
<tr>
<td>Counselling behaviour(^b) (mean ± SD)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ask about PA</td>
<td>4.3 ± 0.7</td>
<td>4.4 ± 0.6</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>Provide PA verbal advice</td>
<td>3.9 ± 0.9</td>
<td>4.3 ± 0.9*</td>
<td>( d = .44 )</td>
<td></td>
</tr>
<tr>
<td>Provide PA written prescription</td>
<td>2.3 ± 1.1</td>
<td>Not</td>
<td>3.0 ± 1.2*</td>
<td>( d = .61 )</td>
</tr>
<tr>
<td>Refer patients</td>
<td>2.1 ± 1.2</td>
<td>measured</td>
<td>2.8 ± 1.2*</td>
<td>( d = .58 )</td>
</tr>
<tr>
<td>Counselling score</td>
<td>12.5 ± 2.6</td>
<td>14.5 ± 2.9*</td>
<td>( d = .73 )</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\)Significantly different from baseline at \( p < .001 \)
\(^b\)Measured on a 7-point scale ranging from 1=Low to 7=High
Pre-post comparisons were made on \( N = 305 \) and pre-follow up comparisons on \( N = 186 \)
NS = not significant; PA = Physical Activity; SD = Standard Deviation; IQR = inter quartile range
Adoption

A Secretary of Health expert conducted the telephone questionnaire with region coordinators. All the region coordinators invited (n=13) completed the telephone questionnaire. Region coordinators were all physicians (54% male) in charge of supervising and coordinating the different platforms (data base), programs and activities within their sanitary region. All indicated that their region adopted the training. Most region coordinators (69%) reported that they found out about the training via the internal electronic communication system, while 31% reported that they heard about it from colleagues or by direct invitation. Over half of region coordinators (62%) reported selecting the physicians who attended the training, while 38% reported that another person (e.g. clinic director) selected physicians. The content analysis revealed that physicians who had a fulltime contract, who were viewed as proactive, who had time to attend the training, and who had a high volume of chronic disease patients were selected to attend the training. This analysis also showed that region coordinators think continuing medical education strategies need evaluation to determine their impact, need financial support and strategies to promote continuity, and that such courses should be mandatory.

Implementation

As planned, one training course per sanitary region was implemented (n=13). Data from the trained observer were used to determine training dose and quality, while data from the trainer were used to determine training fidelity. The average number of physicians attending each session was 26. The mean duration of each training session was 170 minutes (SD=54, range 60-247 minutes). On average, each training module was 42 minutes in length (SD=17, range = 20-60). No significant effects of training duration on
physician Counselling Score were observed. The number of topics presented during each training session was 13 (see Table 3). Regarding fidelity, all four training modules were implemented and all content was covered across training sessions. However, the duration of each module was not implemented as planned and varied across sanitary regions (range 20-60 minutes). Overall, module 1 was longer than planned in 77% of the sessions, module 2 was shorter than planned in 100% of the sessions, and modules 3 and 4 were implemented as planned only in 15% and 38% of the sessions, respectively. Module content modifications were observed in 38% of the topics; these modifications were considered to be very minor, and included shortening the topic time, providing explanations of concepts not included in the topic and allowing more practice time. The quality of the training reported by the observer was good or excellent in 54% and 46% of the sessions, respectively, and 100% of the sessions were qualified as successful. The cost per training session, excluding travel costs, was $429 Mexican pesos ($150 for printed materials and $279 for three hours of the trainer salary).

Table 3. Training dose and fidelity.

<table>
<thead>
<tr>
<th>Modules</th>
<th>Duration</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Planned (mean ±SD)</td>
<td>Implemented as planned</td>
</tr>
<tr>
<td>Module 1</td>
<td>20 minutes</td>
<td>41±13 (17-60)</td>
</tr>
<tr>
<td>- PA benefits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Inactivity risks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Inactivity in Mexico</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Module 2</td>
<td>40 minutes</td>
<td>20 ± 6.3 (10-34)</td>
</tr>
<tr>
<td>- Physician PA promotion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Effectiveness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Strategies in Mexico and the world</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Module 3
- The 5-As model 60 minutes 60±31 (11-100) ✓ ✓
- Counselling recommendations ✓
- Practice

Module 4
- FITT principle 60 minutes 49 ± 22 (15-82) ✓ ✓
- Who should be counselled ✓
- PA prescription ✓ ✓
- How to counsel on PA full practice

*These modules were modified in separate training sessions only one time.
PA = physical activity

Maintenance

Maintenance of the training intervention and its effects were evaluated in the long term by comparing baseline to three-six months after the training. Around 40% (n=119) of physicians were lost at follow-up because they either did not receive the online/printed questionnaire or were no longer working at the Secretary of Health. No significant differences were observed in demographic and outcome variables between physicians who completed the study and those who did not complete it three-six months after the training. Thus, the baseline to follow-up comparisons were conducted on the N=186 physicians who had complete data. Significant increases from baseline to follow-up were observed for physician knowledge (p<.05) indicating that increases in the proportion of physicians reporting that they know the physical activity guidelines, the FITT principle, and the different physical activity intensities were maintained, although follow-up proportions were slightly lower than the post-training proportions (Table 2). A regression model with these knowledge variables as predictors explained 11% of the variance in
follow up Counselling Score \( r^2 = .11, p < .001 \), where physical activity guideline knowledge was the only significant predictor \( \beta = .30, p < .001 \).

Except for asking patients about their physical activity, significant increases were found for all physician physical activity counselling practices \( p < .001 \), with a medium-to-large effect size observed (Table 2). Consequently, significant increases were found for the overall physical activity Counselling Score \( p > .001 \) with a large effect size observed (Table 2). By computing the difference between pre and follow-up Counselling Score for every physician, we found that scores increased for 69% of physicians and did not change/decreased for 31% physicians.

The training effect on physicians’ attitudes, subjective norm, perceived behavioural control and intention for counselling was not maintained as shown by a return to baseline levels at follow-up (Table 2). By computing the difference between pre and follow-up scores for every physician, we found that attitude scores increased for 17% of physicians, subjective norm scores increased for 28% of physicians, perceived behavioural control scores increased for 46% of physicians, and intention scores increased for 29% of physicians. Scores either did not change or decreased for the rest of the physicians. A multiple linear regression with perceived behavioural control and intention follow-up scores as predictors explained 15% of the variance on follow-up Counselling Score \( r^2 = .15, p < .001 \). Only perceived behavioural control was a significant predictor of Counselling Score \( \beta = .38, p < .01 \), exerting a positive influence on the latter.

Regarding sustainability and institutionalization of the training course, because the physical activity counselling training aligns with the mission of the Secretary of
Health and the training model is already institutionalized, the training course is likely to be maintained. Further, the institution is devoting efforts towards preventing NCDs and physical activity promotion will continue to be part of the strategies implement in primary care in Jalisco. Physician training has been introduced as a component of the state-wide strategy against NCDs and six training courses on lifestyle and behaviour change counselling will be implemented in 2014 [40].

Discussion

The purpose of this study was to evaluate the Reach, Effectiveness, Adoption, Implementation and Maintenance of a theory-based training course aimed at improving physical activity counselling among Mexican physicians through the 5-As model. In the short term, the training course was effective for improving physicians’ perceived behavioural control, intention, and knowledge toward counselling. The training course was successfully adopted and implemented across the 13 Jalisco sanitary regions, although the duration of each training session varied. In the long term, the training course was effective for increasing the frequency with which physicians provide verbal advice, write prescriptions and refer patients. The improvements observed in physicians’ knowledge were maintained three to six months after the training but not the improvements in psychosocial variables.

The training course reached a sample of primary care physicians that was similar to the overall physician population in Jalisco according to medical specialty, but slightly different according to sex distribution. Although this limits the representativeness of the sample, the training course effects could still apply to other physicians in Jalisco who
share the demographic characteristics of this sample. We found that women ask more frequently about physical activity than men, adding to the evidence showing that female physicians engage more frequently in preventive care than male physicians [41]. In line with previous reports [18], we found that physically active physicians offer physical activity written prescription more often than their inactive counterparts. Interestingly, we found that rural physicians refer their patients more frequently than urban physicians, which is opposite to that reported in high-income countries [42]. Potential explanations are that rural physicians in Mexico may have more time or resources to refer patients as compared to their urban counterparts, or potential over-reporting of these practices.

The high baseline scores of attitudes, subjective norm and intention may explain the fact that post-training improvements were not maintained in the long term. These scores returned to the high baseline levels three to six months after training, suggesting a potential ceiling effect. Perceived behavioural control scores were moderate at baseline and showed the greatest improvements at post-training. Although scores decreased three to six months after the training, these did not reach baseline levels, suggesting potential maintenance of improvements. Regarding behaviour, we found that perceived behavioural control explained 15% of the variance in physical activity Counselling Score while intention did not have a significant impact. This aligns with previous findings where perceived behavioural control was identified as the main factor influencing physical activity prescription among Mexican physicians [18]. Thus, having control over, and the skills to, provide physical activity counselling is the most important factor influencing physician counselling practices, and the training course seems to have
improved this perception. To maintain these improvements, strategies for reinforcing physicians’ perceived behavioural control in regular clinical practice are needed.

Improvements in physician physical activity counselling and in medical residents’ self-efficacy for prescribing physical activity achieved with two-hour and three-hour training sessions, respectively, have been previously reported [23, 24]. Our findings echo these results showing that a three-hour training course on physical activity counselling promotes improvements in these physician practices. Medium effect sizes on physician counselling practices were achieved with a three-hour training session, costing on average $429 Mexican pesos per session. That is, successfully training physicians on physical activity counselling in Jalisco costs, on average, $2 USD per physician. Further, we found that the training course was adopted by all the sanitary regions in Jalisco, showing the interest in physical activity promotion by the Mexican healthcare sector and the feasibility of implementing such strategy. Our findings suggest that this training course is a low cost, feasible and effective strategy for improving physician evidence-based physical activity counselling practices. Hence, such a strategy has great potential to improve the preventive care offered to the uninsured population who seek healthcare within the Secretary of Health.

Implementation findings show that the content of the training course can be consistently implemented across sessions, while allowing for adaptations to the duration of the modules and sessions. These were mostly field-mandated adaptations made to accommodate the time available at each training site while ensuring complete delivery of training content. The ongoing debate on fidelity versus adaptation is not conclusive, but
some have recognized that adaptation is a natural element of intervention implementation [43]. Our findings support this view given that significant improvements in physician counselling were observed despite the time adaptations made across training sessions. Our implementation findings also show that this training strategy is highly sustainable and can be replicated not only across Jalisco, but potentially across Mexico. Because this training course is already institutionalized within the Jalisco Secretary of Health, involves a single-component (i.e. one training session), and allows for duration adaptations, this strategy has the potential to be replicated across Mexico.

These findings can be used to inform the future implementation of this training course. First, efforts should be made to reach a larger, more representative proportion of physicians from Jalisco. For instance, strategies to reach male physicians, who were underrepresented in the studied sample, could be employed. To improve the effectiveness of the training, strategies for maintaining the improvements achieved on physician perceived behavioural control can be employed. Online refresher sessions, written materials (e.g. manuals, prescription pads) and healthcare team meetings with experts during which the barriers and facilitators to counselling are discussed, are potential ways to promote maintenance. Regarding adoption and implementation of the training course, the travel costs and expert burden could be reduced. For instance, a “train the trainer” approach can be implemented to prepare other experts across Jalisco to deliver the training, rather than having a single expert traveling across the state. This in turn, would reduce expert burden and training costs by eliminating travel and accommodation expenses and by reducing the amount of training sessions each expert would have to
deliver. The training course the Secretary of Health implemented is a promising, feasible and sustainable strategy for systematically introducing physical activity promotion into the primary care setting, and findings from this study can help improve its implementation, effectiveness and maintenance.

The main limitations of the present study are the following. First, the study design employed prevents us from determining if the training course works better than other approaches or than no training at all. Second, physical activity counselling practices were measured using a self-report tool, which is prone to information bias that may affect the reporting of these practices. Further, counselling practices were assessed before and three to six months after the training, which prevents us from determining if improvements in these practices were maintained after six months. The assessment of patient medical records is underway and we expect to obtain more information about physician counselling practices before and after the training to strengthen this evaluation. Third, because demographic information of the physician population in Jalisco is lacking, representativeness of our sample was assessed on the basis of the information available (i.e. medical specialty and sex). Thus, conclusions about the evaluation of the present training intervention should be interpreted in light of these limitations.

**Conclusion**

This physician training course was found to be effective for improving TPB constructs and counselling knowledge in the short term, and for improving physical activity counselling practices in the long term. The training intervention was adopted and implemented in all sanitary regions and showed that the content of the training can be
consistently implemented while allowing for time adaptations. This training strategy is a promising, feasible and low cost strategy that is already institutionalized within the Secretary of Health, which can facilitate its continual implementation and sustainability. The recommendations provided in this study can help improve the implementation, effectiveness and maintenance of future training courses. Future evaluations should employ methods that pay attention to both, internal and external validity factors.

References


Chapter 6

General Discussion

Guided by the knowledge-to-action (KTA) framework, the objective of this dissertation was to identify gaps in physical activity prescription practices among Mexican primary care physicians, to assess Mexican healthcare environments for their potential to promote physical activity and to evaluate the impact of a training strategy on physician physical activity counselling practices. In this section, I present a summary of the main findings; highlight the strengths and limitations of this dissertation; discuss implications for future physical activity promotion in Mexican healthcare settings; and highlight areas for future research.

7.1 Summary of Findings

The first dissertation study corresponds to Phase I and Phase II of the KTA model. With this study, we identified low physician physical activity prescription rates, identified the factors and barriers influencing prescription, and identified an evidence-based tool to help physicians improve these practices. The Theory of Planned Behaviour (TPB) guided this study and provided insight regarding physician prescription behavior, although not all the theory tenets were supported. Overall, Mexican primary care physicians have a positive attitude toward prescribing physical activity, experience social pressure to prescribe it, and strongly intend to do it. However, they perceive a modest level of ability to prescribe physical activity and their prescription rates are low. Regarding predictors of intention and behaviour, we found that subjective norm and
attitude explained behavioural intention, while perceived behavioural control and physician physical activity explained prescription behaviour.

The TPB was not fully supported in this sample of Mexican physicians. Only subjective norm and perceived behavioural control explained intention and behaviour, while, attitude and intention did not emerge as significant predictors. The lack of influence of intention upon behaviour has been identified as the intention-behaviour gap (Sheeran, 2002) and is not addressed within the TPB. The TPB is a motivational theory that focuses on the intention formation phase of the behaviour change process and does not address the factors involved in intention translation (Conner & Norman, 2005).

Because only perceived behavioural control and physical activity explained behaviour in this study, the TPB may not be the best model for explaining prescription behaviour among Mexican physicians. Our findings suggest that strategies for improving physicians’ knowledge and skills to prescribe physical activity as well as to improve their own physical activity behaviours seem worthwhile.

The TPB was developed within a high-income country and it has been mostly studied in similar contexts. Socio-cultural and economic factors in Mexico differ from those of high-income countries (World Bank, 2014) and the TPB does not capture such factors. This may limit the predictive power and appropriateness of the TPB to explain behaviour within the Mexican healthcare context. More research testing the TPB among Mexican physicians and physicians from other countries is needed to better understand physical activity prescription behaviour in different situations and contexts. Further, adaptations of the TPB could also be explored by moulding it to the culture and context in which it is being employed. Finally, because the TPB may not be the most appropriate
and useful model to explain prescription behaviour in Mexico, other theories should be investigated (e.g. Social Cognitive Theory, Health Action Process Approach) to identify the most appropriate model for this context and population.

The second dissertation study corresponds to Phase II of the KTA framework. To better understand the Mexican healthcare context, we assessed the informational, educational and instrumental environments of clinics and hospitals for their potential to promote physical activity. In this study, the Healthcare Environment Assessment Tool (HEAT) was developed and found to be a promising and feasible tool to systematically assess the availability and quality of environmental features hypothesized to influence physical activity within healthcare settings. Using the HEAT, we found that the instrumental environment in the assessed clinics/hospitals included some encouraging features. Stairs and outdoor spaces were available and accessible, clean and safe, which has been shown to promote its use (Crespo, Sallis, Conway, Saelens, & Frank, 2011; Meyer et al., 2010; Nicoll, 2007). However, these spaces were not visible from the clinic entrance or main path of travel. The informational and educational environments were poor. Despite signage has been shown to promote stair use (Bungum, Meacham, & Truax, 2007), sings indicating stair location were seldom present and nonexistent for outdoor spaces. Although some posters and cartels were observed in primary care clinics, the physical activity information presented was neither sufficient nor theory-based. To improve their physical activity promotion potential, such posters could employ tailored messages, gain-framed messages, and self-efficacy change messages (Latimer, Brawley, & Bassett, 2011).
This is the first study to examine the physical activity environment in healthcare settings within the context of a middle-income country. Potential physical activity promotion strategies relevant to this context were identified. First, given that stairs are already available in many clinics and hospitals, encouraging stair use (e.g. through signage and stair use prompts) and improving stair visibility represent feasible strategies for promoting their use. Second, the use of elevators in these settings could be discouraged by having fewer elevators working in the building (e.g. three out of four) or programming elevators to only stop on every other floor. Third, improving access to, and conditions of, existing outdoor spaces represent additional ways in which to enhance the physical activity opportunities in healthcare settings. Lastly, improving the content of physical activity cartels and using gained-framed and self-efficacy messages, represents a feasible and low cost strategy to promote physical activity in these settings.

The third dissertation study corresponds to Phase III of the KTA framework, where we evaluated the Reach, Effectiveness, Adoption, Implementation, and Maintenance of a physician training strategy aimed at improving physical activity counselling practices. The training course reached a sample of primary care physicians that was similar to the overall physician population in Jalisco according to medical specialty, although female physicians were overrepresented. We found that a three-hour training course was effective for improving physicians’ perceived behavioural control to, intention to, and knowledge to, counsel. Further, the training course was successfully adopted and consistently implemented across the 13 Jalisco sanitary regions, costing on average $429 Mexican pesos per session on average. Three to six months after the
training course, improvements in physician physical activity counselling practices were observed and improvements in physician knowledge were maintained.

In line with findings from similar studies (Eckstrom, Hickam, Lessler, & Buchner, 1999; Marcus et al., 1997), our findings show that a training course on physical activity counselling promotes improvements in these physician practices. Our findings also show that this training course is a feasible, low cost strategy that is already institutionalized within a government institution, which facilitates its continual implementation and sustainability. However, the reach, implementation and long-term effects of the training strategy can likely be improved. First, efforts should be made to reach a larger, more representative proportion of physicians from Jalisco (i.e., male physicians). Regarding implementation, the travel costs and burden experienced by the expert delivering the training could be reduced by teaching other health professionals across Jalisco how to implement the training strategy. To promote maintenance of training effects, ongoing strategies for sustaining improvements in physician perceived behavioural control and knowledge should be employed (e.g. refresher sessions, manuals, team meetings).

Findings revealed a consistent psychosocial predictor of physical activity counselling behaviour among Mexican primary care physicians, identified a promising strategy for improving these practices and showed that the Mexican healthcare context provides some opportunities to promote physical activity. Physician findings from the first and third studies align showing that perceived behavioural control is the main factor explaining physical activity counselling behaviour. Further, these findings show that the low physical activity counselling rates among primary care Mexican physicians can be
improved through a theory-based training course, which can be widely adopted and consistently implemented at low cost. Physician- and organization-level evidence-based strategies for promoting physical activity within Mexican healthcare settings are still needed, and this dissertation represents a promising first step in that direction.

7.2 Strengths

One of the main strengths of this dissertation is the international, government-university partnership that was developed to conduct this research. The fact that this study was designed and implemented in collaboration with the Jalisco Secretary of Health is a major accomplishment in itself, given the many challenges inherent to such partnerships and given the cultural, structural and professional challenges related to international collaborative work (Martin, Craft, & Tillema, 2002). This partnership allowed us to conduct research under real world conditions within the context of existing strategies, thereby facilitating the adoption, implementation and sustainability of the training course (Glasgow, 2006). Further, this government-university partnership showed that scientific rigour and real world health promotion efforts are compatible (Allison & Rootman, 1996), where researchers provided the theory base and methodologies to conduct this study, and the Secretary of Health provided the resources to implement and evaluate the training strategy. Finally, this partnership provided a unique opportunity for exchanging and transferring knowledge, where the knowledge generated is useful to both Secretary of Health decision makers and researchers (Graham et al., 2006).

A second strength of this dissertation is the theoretical foundation that guided our knowledge translation efforts. Three theoretical frameworks were employed; the KTA framework, the TPB and the RE-AIM framework. This is consistent with
recommendations to use an armamentarium of theoretical frameworks to better guide and understand the process of knowledge translation (Estabrooks, Thompson, Lovely, & Hofmeyer, 2006). First, the KTA framework (Graham et al., 2006) guided the overall knowledge translation strategy by outlining three phases of action. Secondly, to influence physician behaviour, the training strategy was framed on the TPB (Ajzen, 1991), which provided the psychosocial basis for modifying physician behaviour and valid indicators of training impact. Finally, the RE-AIM framework (Glasgow, Vogt, & Boles, 1999) provided a set of validated indicators to evaluate the Reach, Effectiveness, Adoption, Implementation and Maintenance of the training strategy.

Evidence about the feasibility and effectiveness of knowledge translation frameworks is limited (Straus, Tetroe, & Graham, 2009). This dissertation provides evidence of the applicability and feasibility of using the KTA framework within the context of a middle-income country, and demonstrates the usefulness of integrating a number of theoretical frameworks to strengthen knowledge translation efforts. Further, working with an established strategy implemented under real conditions allowed us to conduct a natural experiment, which is a valuable tool in public health research (Petticrew et al., 2005).

A final strength of this dissertation was the state-wide physician sample achieved in studies one and three. In these studies, Secretary of Health primary care physicians from the 13 sanitary regions in Jalisco where reached, achieving representation at the physician and regional levels. This strengthens the external validity of our findings and suggests that the training strategy is promising for reaching primary care physicians across regions. Further, the Secretary of Health serves the uninsured Mexican population.
(45%), which is of low socioeconomic status and receives limited preventive care (Barraza, Bertozzi, Gonzlez, & Gutierrez, 2002; Frenk, Gomez, & Knaul, 2009). This dissertation focused on improving physician physical activity counselling practices, which could contribute to improve the preventive care services available for the uninsured population.

7.3 Limitations

The main limitations of this dissertation are the lack of objective physician-level measures and qualitative measures, the lack of physician- and clinic-level process measures, and the study design and sampling method employed in the training study.

The first limitation is that physician counselling practices were measured by self-report, which is prone to social desirability that may bias true estimates of physician practices (Singleton & Straits, 2005). Further, counselling practices were assessed before and three to six months after the training, which limits our ability to determine if the post-training improvements observed were maintained after six months. Finally, we only employed quantitative measures, which cannot fully capture the factors involved in the process of implementing physical activity counselling in regular practice (Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004).

The second limitation of this dissertation is the lack of physician- and clinic-level process measures and strategies for assessing and promoting the sustained implementation of the physical activity counselling tool (i.e. the 5-As model). From an assessment perspective, monitoring physicians’ physical activity prescription behaviours in the clinic (e.g., by directly observing physician consultations) would have provided objective information on physicians’ implementation of the training. From an
implementation perspective, a training strategy alone is unlikely to promote long-term implementation of evidence in clinical practice and organization-level approaches are needed to promote this process (Straus et al., 2009). Specifically, the inclusion of physical activity indicators in the patient medical records, the introduction of physical activity prescription pads in physicians’ office and the institutionalization of the 5-As model in regular practice could have been employed.

A third limitation was the design employed in the physician training study, which prevents us from determining if the training course works better than other approaches or than no training at all. Moreover, the sampling method employed in the physician training is prone to selection bias, where physicians already interested in promoting physical activity may have been more likely to participate in studies one and three (Szklo & Nieto, 2007). Finally, because demographic information of the physician population in Jalisco is lacking, physician sample representativeness was assessed on the basis of the information available (i.e. medical specialty and sex).

A final limitation of this dissertation is that the generalizability of physician findings is limited to physicians in one Mexican state, from one healthcare system. Knowledge translation is a context-specific process (Greenhalgh et al., 2004) and only primary care clinics and hospitals from the Secretary of Health were included in the physician and training studies. Thus, findings from these studies are only relevant to physicians from Jalisco working in this sector of the Mexican healthcare system. The conclusions reached in this dissertation should be interpreted in light of the aforementioned limitations.
7.4 Implications

This is the first study investigating strategies to promote evidence-based physical activity promotion practices within Mexican healthcare settings and findings from this dissertation shed light on potential approaches for facilitating such endeavour. First, information about Mexican physicians’ physical activity counselling rates was obtained for the first time and potential strategies for improving these practices were identified. This study sets a basis for monitoring physician physical activity counselling practices in the future, for identifying gaps in these practices and for designing interventions to address these gaps.

Second, government-university partnerships are not common practice in Mexico and this dissertation demonstrates that such partnership is not only feasible but also imperative in knowledge translation efforts. In this collaborative project, the Secretary of Health implemented the physician training strategy under real world conditions, while researchers provided scientific methods to evaluate this strategy. Only through such collaboration were we able to design an effective strategy that was widely adopted, consistently implemented, and likely sustainable. This dissertation demonstrates that a three-hour, low cost training delivered by Secretary of Health staff was effective for improving knowledge, perceive behavioural control, and overall physical activity counselling practices among Mexican primary care physicians.

Finally, because healthcare environments are complex, assessing these settings is essential to understand the context and fit of knowledge translation efforts (Estabrooks et al., 2006). In this dissertation, the informational, educational and instrumental environments within healthcare settings were assessed for their potential to promote
physical activity among patients and physicians. A novel and promising tool was developed, which can be used to monitor physical activity promotion efforts implemented in healthcare environments. Further, this tool can be used to evaluate potential interventions targeting environmental changes within healthcare settings not only in Mexico but also in other Latin American countries. Because the three Mexican healthcare systems were represented in this study, these findings are relevant across healthcare systems within the state of Jalisco. Reporting the context in which health promotion efforts are implemented is essential for informing future efforts and assisting policy makers in reaching decisions (Luoto, Shekelle, Maglione, Johnsen, & Perry, 2014).

Overall, this dissertation demonstrates the feasibility of employing a variety of theoretical frameworks to guide knowledge translation efforts within a middle-income country. Specifically, this dissertation provides evidence of the feasibility and usefulness of the KTA framework within the Mexican healthcare context, which can inform future efforts implemented in these settings (Graham & Tetroe, 2007). Further, this dissertation demonstrates the usefulness of employing the RE-AIM framework to overcome the evaluation limitations of the KTA framework. Similarly, the TPB provided insight into the psychosocial factors influencing prescription behaviour among Mexican physicians. This dissertation sheds light onto promising paths that can guide future knowledge translation efforts aimed at improving physical activity promotion in Mexican healthcare settings.

7.5 Future Directions

This dissertation highlights the importance of addressing physician psychosocial factors and the significance of collaboratively working with practitioners and
stakeholders to promote evidence-based physical activity counselling practices. To better understand knowledge translation in the Mexican healthcare diaspora, future research should focus on illuminating the process of implementing evidence in clinical practice, identifying factors from different ecological levels, and studying this process across time, healthcare professionals and healthcare systems.

This dissertation focused on evaluating the impact of a knowledge translation strategy at the physician level. Future efforts should aim to illuminate the process involved in the implementation of evidence in clinical practice at the physician and clinic levels. To better understand this process, it is necessary to also identify the factors that foster or hinder the use and sustainability of evidence at the individual, interpersonal and organizational levels. Identifying these factors and understanding how they interact can shed light on potential approaches to promote evidence use among physicians and on clinic-level resources to support the continual use of evidence.

In this dissertation, the KTA framework was deemed as appropriate and was employed to guide short-term knowledge translation efforts. Future studies should aim to investigate strategies for monitoring and promoting the sustained use of evidence in clinical practice. Implementing effective strategies for promoting the adoption of evidence (one time decision) is a first important step, but a more critical one is the implementation of approaches for maintaining the continual use of evidence in the long term (Graham et al., 2006). Further, future studies could use other knowledge translation frameworks to determine their feasibility and usefulness within the Mexican context and when possible, compare the advantages of using one framework over another (Graham & Tetroe, 2007).
Lastly, future knowledge translation efforts in Mexico should be longitudinal, implemented across the different healthcare systems and include the array of practitioners working in these settings. Because knowledge translation is a dynamic iterative process (Graham et al., 2006), longitudinal knowledge studies that help understand rates of adoption of evidence over time, its continual use and the factors involved in this process are needed. Understanding the knowledge translation process across healthcare professionals could help design interventions that are relevant to the wide range of professionals working in healthcare settings in Mexico. Further, knowledge translation efforts in healthcare should be driven by the characteristics of the context (Straus, Tetroe, & Graham, 2011); thus, to better understand the importance of the healthcare context, future knowledge translation studies should include the three healthcare systems in Mexico.

7.6 Conclusions

The implementation of evidence-based physical activity promotion practices in Mexican healthcare settings is a promising strategy for battling the rising health burden of physical inactivity in the country. This dissertation demonstrates the feasibility of the KTA framework for guiding this process as well as the usefulness of employing a multi-framework approach to strengthen these efforts. This dissertation demonstrates that physician- and organization-level evidence-based strategies for promoting physical activity are needed, and that the physician training strategy represents a promising first step on that direction. Further, the significance and feasibility of collaboratively working with practitioners and stakeholders to promote evidence-based physical activity counselling practices was demonstrated. This dissertation provides preliminary evidence
for guiding future knowledge translation efforts implemented in Mexican healthcare settings. Future studies should focus on depicting the factors and characteristics implicated in this process.

7.7 References


APPENDIX A

Ethics Approval Letters

October 24, 2011

Ms. Karla Galviz
Graduate Student
School of Kinesiology and Health Studies
Queen’s University
28 Division Street
Kingston, ON K7L 3N6

GREB Ref #: GPHE-113-11; Romeo # 6098262
Title: “GPHE-113-11 Exercise is Medicine”

Dear Ms. Galviz:

The General Research Ethics Board (GREB), by means of a delegated board review, has cleared your proposal entitled “GPHE-113-11 Exercise is Medicine” for ethical compliance with the Tri-Council Guidelines (TCPS) and Queen’s ethics policies. In accordance with the Tri-Council Guidelines (article D.1.6) and Senate Terms of Reference (article G), your project has been cleared for one year. At the end of each year, the GREB will ask if your project has been completed and if not, what changes have occurred or will occur in the next year.

You are reminded of your obligation to advise the GREB, with a copy to your unit REB, of any adverse event(s) that occur during this one year period (access this form at https://services.queensu.ca/romeo_researcher/ and click Events - GREB Adverse Event Report). An adverse event includes, but is not limited to, a complaint, a change or unexpected event that alters the level of risk for the researcher or participants or situation that requires a substantial change in approach to a participant(s). You are also advised that all adverse events must be reported to the GREB within 48 hours.

You are also reminded that all changes that might affect human participants must be cleared by the GREB. For example you must report changes to the level of risk, applicant characteristics, and implementation of new procedures. To make an amendment, access the application at https://services.queensu.ca/romeo_researcher/ and click Events - GREB Amendment to Approved Study Form. These changes will automatically be sent to the Ethics Coordinator, Gail Irving, at the Office of Research Services or irvingg@queensu.ca for further review and clearance by the GREB or GREB Chair.

On behalf of the General Research Ethics Board, I wish you continued success in your research.

Yours sincerely,

Joan Stevenson, Ph.D.
Professor and Chair
General Research Ethics Board

cc: Dr. Lucie Lewaque, Faculty Supervisor and Co-Investigator
Dr. Rebecca Lee, Dr. Felipa Lobato, and Dr. Juan Lopez, Co-Applicants
Dr. Spencer Moore, Chair, Unit REB
Josie Birchall, Dept. Admin.
September 25, 2012

Ms. Karla Galviz  
Ph.D. Candidate  
School of Kinesiology and Health Studies  
Queen’s University  
28 Division Street  
Kingston, ON K7L 3N6

GREB Romeo #: 6006362  
Title: “GPHE-113-11 Exercise is Medicine”

Dear Ms. Galviz:

The General Research Ethics Board (GREB) has reviewed and approved your request for renewal of ethics clearance for the above-named study. This renewal is valid for one year from October 24, 2012. Prior to the next renewal date you will be sent a reminder memo and the link to ROMEO to renew for another year.

You are reminded of your obligation to advise the GREB of any adverse event(s) that occur during this one year period. An adverse event includes, but is not limited to, a complaint, a change or unexpected event that alters the level of risk for the researcher or participants or situation that requires a substantial change in approach to a participant(s). You are also advised that all adverse events must be reported to the GREB within 48 hours. Report to GREB through either ROMEO Event Report or Adverse Event Report Form at http://www.queens.ca/oru/researchethics/GeneralREB/forms.html.

You are also reminded that all changes that might affect human participants must be cleared by the GREB. For example you must report changes in study procedures or implementations of new aspects into the study procedures. Your request for protocol changes will be forwarded to the appropriate GREB reviewers and/or the GREB Chair. Please report changes to GREB through either ROMEO Event Reports or the Ethics Change Form at http://www.queens.ca/oru/researchethics/GeneralREB/forms.html.

On behalf of the General Research Ethics Board, I wish you continued success in your research.

Yours sincerely,

Joan Stevenson, Ph.D.  
Professor and Chair  
General Research Ethics Board

c.c.: Dr. Lucie Levesque, Co-Principal Investigator  
Dr. Rebecca Lee and Ms. Edma Jenyou, Co-investigators  
Dr. Juan Lopez, Collaborator  
Dr. Spencer Moore, Chair, Unit REB  
April 17, 2013

Ms. Karla Galaviz
Ph.D. Candidate
School of Kinesiology and Health Studies
Queen's University
28 Division Street
Kingston, ON K7L 3N6

Dear Ms. Galaviz

RE: Amendment for your study entitled: GPHE-113-11 Exercise in Medicine; ROMEO# 6006362

Thank you for submitting your amendment requesting the following changes:

1) To change the title of the project from “Exercise in Medicine” to “Pausa Laboral para la Salud”;
2) To change the role of Ms. Karla Galaviz from Principal Investigator to Co-investigator;
3) To change the role of Dr. Lucie Levesque from Co-Principal Investigator to Principal Investigator;
4) To add Dr. Jan Janssen, and Dr. Paul Estebrooks as Co-investigators;
5) To collect data from physicians and patients;
6) To make changes to the methods as outlined;
7) To add two new Physician Letters of Information;
8) To add a new Patient Letter of Information;
9) To compensate physicians with a gift card worth approximately $25 CDN and patients with a monetary incentive worth approximately $10 CDN each time they complete the questionnaire (initially and at three and six months), for their participation;

By this letter you have ethics clearance for these changes. The Romeo file has been updated accordingly.

Good luck with your research.

Sincerely

[Signature]

John Freeman
Acting Chair, GREB

c. Dr. Lucie Levesque, Co-Principal Investigator
   Dr. Rebecca Lee and Edna Jauregui, Co-investigators
   Dr. Juan Lopez, Collaborator
APPENDIX B
Manuscript 1 Questionnaire

CUESTIONARIO DE PRESCRIPCIÓN DE LA ACTIVIDAD FÍSICA

Antes de comenzar, por favor crea tu número de identificación personal (compuesto por las 3 primeras letras de tu apellido paterno y los últimos 4 dígitos tu número telefónico). Este número será usado para identificar tu cuestionario durante este estudio y en caso de que desees retirar tus datos.

NIP: ______________________________

1. ¿En qué hospital/centro de salud trabajas? ______________________________

2. ¿Cual es tu puesto allí? ______________________________

3. ¿En qué municipio se encuentra tu hospital/ centro de salud? ______________________________

4. ¿A qué tipo de población pertenece? ☐ Rural ☐ Urbana

5. ¿Cuál es tu especialidad médica? ______________________________

6. ¿Cuántos años de práctica médica profesional tienes? ______________________________

7. Género ☐ Femenino ☐ Masculino

8. Fecha de nacimiento ______________________________

9. Por favor, indica que tan frecuentemente realizas cada una de las siguientes actividades como parte de tu práctica médica regular:

   a) **Preguntas** a tus pacientes sobre sus niveles de actividad física

      Siempre ☐ Usualmente ☐ Ocasionalmente ☐ Raramente ☐ Nunca ☐

   b) Le das a tus pacientes direcciones **verbales** para un programa de actividad física

      Siempre ☐ Usualmente ☐ Ocasionalmente ☐ Raramente ☐ Nunca ☐

   c) Le das a tus pacientes direcciones **escritas** para un programa de actividad física

      Siempre ☐ Usualmente ☐ Ocasionalmente ☐ Raramente ☐ Nunca ☐

   b) **Evalúas** el fitness de tus pacientes como parte de un examen físico o a través de una prueba física

      Siempre ☐ Usualmente ☐ Ocasionalmente ☐ Raramente ☐ Nunca ☐

   c) **Refieres** a tus pacientes a profesionales de la actividad física

      Siempre ☐ Usualmente ☐ Ocasionalmente ☐ Raramente ☐ Nunca ☐
La prescripción de la actividad física incluye el preguntar a tus pacientes sobre sus niveles de actividad física y el ofrecer direcciones verbales o escritas para mejorar sus niveles de actividad física. Por favor, ten esto en mente mientras contestas las siguientes preguntas.

10. ¿Prescribes tu actividad física a tus pacientes?

☐ SI ☐ NO (por favor pasa a la pregunta 13)

11. ¿Cuál es la naturaleza de la prescripción de actividad física que ofreces? Por favor da un breve ejemplo.

12. ¿En qué situaciones prescribes actividad física?

13. ¿Has recibido entrenamiento sobre la prescripción de actividad física?

☐ No ☐ Si (por favor describe el tipo de entrenamiento)

14. Por favor, selecciona la barrera(s) que te impide prescribir actividad física a tus pacientes (selecciona todas las que apliquen):

☐ No tengo tiempo ☐ No sé cómo prescribir actividad física
☐ No me pagan por hacerlo ☐ No creo que puedo prescribir actividad física
☐ Los pacientes no siguen la prescripción ☐ Otra (por favor específica)_______________
15. Los siguientes enunciados son sobre actitudes relacionadas con la prescripción de actividad física. Por favor encierra el número que mejor represente tu situación en cada enunciado.

a) Creo que el prescribir actividad física para promover la salud de mis pacientes es generalmente:

- Buena práctica médica
- Útil
- Apropiado
- Necesario

b) Dentro de los próximos 6 meses, mi intención es el prescribir actividad física a mis pacientes para promover su salud

- Completamente de acuerdo
- Completamente en desacuerdo

c) Dentro de los próximos 6 meses, me gustaría prescribir actividad física a mis pacientes para promover su salud

- Completamente de acuerdo
- Completamente en desacuerdo

d) Dentro de los próximos 6 meses, planeo prescribir actividad física a mis pacientes para promover su salud

- Completamente de acuerdo
- Completamente en desacuerdo

e) La mayoría de los médicos estarían de acuerdo en prescribir actividad física para promover la salud de los pacientes

- Completamente de acuerdo
- Completamente en desacuerdo

f) En general, me siento bajo presión para prescribir actividad física a mis pacientes para promover su salud

- Completamente de acuerdo
- Completamente en desacuerdo
g) Personas que son importantes para mi piensan que yo debería prescribir actividad física a mis pacientes para promover su salud
Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

h) El Colegio de Médicos AC aprobaría la prescripción de actividad física para promover la salud de los pacientes
Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

i) El prescribir actividad física a mis pacientes es:
Muy fácil 1 2 3 4 5 6 7 Muy difícil

j) Me siento confiado de que podría prescribir actividad física a mis pacientes si así lo quisiera:
Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

k) Existen factores fuera de mi control que me impiden prescribir actividad física a mis pacientes:
Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

l) Tengo completo control sobre el prescribir o no prescribir actividad física a mis pacientes:
Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

m) ¿Qué tan probable es que tu prescribas actividad física a tus pacientes en los próximos 6 meses?
Muy probable 1 2 3 4 5 6 7 Poco probable

Las siguientes preguntas conciernen al conocimiento general sobre actividad física.

16. La actividad física ayuda a prevenir las enfermedades cardiovasculares porque:
- [ ] Disminuye la coagulación sanguínea
- [ ] Incrementa el flujo sanguíneo a los músculos
- [ ] Reduce la presión sanguínea
- [ ] Mejora el perfil lipo-proteico
Mejora el consumo máximo de oxígeno (VO2max)
Reduce la glucosa en sangre
No lo se

17. ¿Conoces las guías internacionales de actividad física?

☐ SI ☐ NO (por favor pasa a la pregunta 19)

18. Por favor, llena los espacios. Las guías internacionales de actividad física recomiendan que:

- Para beneficios en salud, los niños y jóvenes entre 5 y 17 años de edad deben acumular por lo menos __________ minutos de actividad física de intensidad moderada-a-vigorosa a cada día.

- Para beneficios en salud, los adultos entre 18 y 64 años de edad deben acumular por lo menos ___ minutos de actividad física de intensidad moderada-a-vigorosa a la semana en periodos de por lo menos ________ minutos o más.

- Para beneficios en salud, los adultos de 65 años o más deben acumular por lo menos __________ minutos de actividad física de intensidad moderada-a-vigorosa a la semana en periodos de por lo menos ________ minutos o más.

19. ¿Conoces el principio FITT (frecuencia, intensidad, tipo y tiempo) para la prescripción de actividad física?

☐ SI ☐ NO (por favor ve a la pregunta 20)

20. Describe cada elemento del principio FITT para la prescripción de la actividad física:

- Frecuencia:
- Intensidad:
- Tipo:
- Tiempo:

21. ¿Conoces las diferentes intensidades de la actividad física?

☐ SI (por favor escribíelas) ☐ NO
22. Clasifica cada uno de los siguientes enunciados como cierto o falso:

<table>
<thead>
<tr>
<th></th>
<th>Cierto</th>
<th>Falso</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) La actividad física es beneficil solamente si es de intensidad vigorosa</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>b) Cualquier intensidad de actividad física es beneficil</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>c) Los mayores beneficios de la actividad física son vistos cuando las personas inactivas se hacen por lo menos ligeramente activas</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

23. Las siguientes preguntas están relacionadas con tus niveles de actividad física.

a) Piensa en todas las actividades **vigorosas** que realizaste en los últimos 7 días. Actividades vigorosas son aquellas que requieren un esfuerzo físico intenso que te hace respirar mucho más rápido de lo normal y que hacen a tu corazón latir muy rápido. Piensa solo en aquellas actividades que duraron por lo menos **10 minutos** por sesión.

Durante los últimos 7 días ¿en cuántos días realizaste actividades físicas vigorosas tales como levantar cosas pesadas, correr o nadar?

Veces por semana ______

¿Cuánto duraron estas sesiones?

☐ 10-15 minutos  
☐ De 16 a 30 minutos  
☐ De 31 minutos a 1 hora  
☐ Más de 1 hora  
☐ No lo se

b) Ahora, piensa en todas las actividades físicas **moderadas** que realizaste en los últimos 7 días. Actividades físicas moderadas son aquellas que requieren un esfuerzo físico mediano y que te hacen respirar un poco más intenso de lo normal. Piensa solo en aquellas actividades que duraron por lo menos **10 minutos** por sesión.

Durante los últimos 7 días ¿en cuántos días realizaste actividades físicas moderadas tales como andar en bicicleta, jugar baseball o subir escaleras? No incluyas caminar.

Veces por semana ______
¿Cuánto duraron estas sesiones?

- [ ] 10-15 minutos
- [ ] De 16 a 30 minutos
- [ ] De 31 minutos a 1 hora
- [ ] Más de 1 hora
- [ ] No lo sé

c) Ahora, piensa en todas las actividades físicas ligeras que realizaste en los últimos 7 días. Actividades físicas ligeras son aquellas que requieren un esfuerzo físico mínimo como por ejemplo caminar, hacer jardinería o limpiar.

Durante los últimos 7 días ¿en cuántos días realizaste actividades físicas ligeras?

Veces por semana _______

¿Cuánto duraron estas sesiones?

- [ ] 10-15 minutos
- [ ] De 16 a 30 minutos
- [ ] De 31 minutos a 1 hora
- [ ] Más de 1 hora
- [ ] No lo sé

Gracias por completar este cuestionario!
# Appendix C

Manuscript 2 Healthcare Environment Assessment Tool

## A) Physical Activity Built Environment

<table>
<thead>
<tr>
<th>1. Clinic information</th>
<th>2. Stairs</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Institution</td>
<td>No</td>
</tr>
<tr>
<td>IMSS/ISSSTE □ SSJ □ Private □</td>
<td>Yes UTD</td>
</tr>
<tr>
<td>b) Type of clinic:</td>
<td></td>
</tr>
<tr>
<td>Public □ Private □</td>
<td></td>
</tr>
<tr>
<td>c) Level of care</td>
<td></td>
</tr>
<tr>
<td>Primary □ Secondary □ Tertiary □</td>
<td></td>
</tr>
<tr>
<td>d) Number of floors:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Elevators</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Are there elevators?</td>
</tr>
<tr>
<td>b) Are elevators visible?</td>
</tr>
<tr>
<td>c) Are elevators accessible?</td>
</tr>
<tr>
<td>d) Are there clear signs about elevator location?</td>
</tr>
<tr>
<td>e) Are elevators the principal means of vertical travel?</td>
</tr>
<tr>
<td>f) Are elevators clean?</td>
</tr>
<tr>
<td>g) Are elevators safe?</td>
</tr>
</tbody>
</table>

## B) Promotional and Educational Materials About Physical Activity

<table>
<thead>
<tr>
<th>1. Are there physical activity:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posters □ Flyers □ Articles posted □ Cartels □</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Main floor</td>
</tr>
<tr>
<td>Waiting room</td>
</tr>
<tr>
<td>Framed</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Are there physical activity:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaflets □ Brochures □ Tipsheets □</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Where do educational/promotional materials related to physical activity come from?</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Pharmaceutical companies □</td>
</tr>
<tr>
<td>c) Secretary of health □</td>
</tr>
<tr>
<td>e) National Institutes of Social Security (IMSS, ISSSTE) □</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No</th>
<th>Yes</th>
<th>UTD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
HEAT INSTRUCTIONS

PART A

1. Conduct the assessment of each clinic/hospital at the same time of the day (i.e. in the morning or in the afternoon every day)
2. Walk in through the main clinic/hospital door until you get to the main room (lobby)
3. Complete the clinic information section
4. Stand at one corner of the main room (lobby) and:
   a. Look for visibility, accessibility and signage for stairs
   b. Look for visibility, accessibility and signage for elevators
   c. Look for visibility, accessibility and signage for green spaces
5. Determine what is the principal means of travel vertically: stairs or elevators
6. Use the stairs and look if they are clean and safe
7. Use an elevator and look if it is clean and safe
8. Go to the green space area and get in if possible. Determine if it’s clean and safe
9. Finish part A assessment and return to lobby area

PART B

1. Stand at one corner of the lobby and look at the walls and doors for physical activity posters, flyers and articles posted. If these are available then:
   a. Record how many are there
   b. Record what is the frame (gain frame or loss frame) of the message in the poster.
   c. Record the content of the poster (i.e. what physical activity message/information is presented)
   d. Record which institution or organization developed the poster
2. Walk around the lobby looking for physical activity Leaflets, brochures and tip-sheets available for patients; look closely at tables, chairs and front desks. If these are available then:
   a. Record how many are there
   b. Record what is the frame (gain frame or loss frame) of the message in the brochure.
   c. Record the content of the brochure (i.e. what physical activity message/information is presented)
   d. Record which institution or organization developed the brochure
3. Go to the cardiology or trauma or endocrinology waiting room
4. Stand at one corner of the room and look at the walls and doors for physical activity posters, flyers and articles posted. If these are available then:
   a. Record how many are there
   b. Record what is the frame (gain frame or loss frame) of the message in the poster.
c. Record the content of the poster (i.e. what physical activity message/information is presented)
d. Record which institution or organization developed the poster

5. Walk around the room looking for physical activity Leaflets, brochures and tip-sheets available for patients; look closely at tables, chairs and front desks. If these are available then:
   a. Record how many are there
   b. Record what is the frame (gain frame or loss frame) of the message in the brochure.
c. Record the content of the brochure (i.e. what physical activity message/information is presented)
d. Record which institution or organization developed the brochure

6. Finish part B assessment and leave the room

**OPERATIONAL DEFINITIONS**

- Visible: highly visible from either the hospital’s entrance or principal path of travel
- Accessible: direct access from either the hospital’s entrance or principal path of travel
- Clear signage: visible and clear signs in the lobby that accurately direct you to the stair/elevator
- Principal means of travel: the most traveled path within the hospital
- Green space: an open area with grass or trees in the hospital that people can use
- Clean: free of garbage, graffiti and well painted
- Safe:
  - Stairs - slip-resistant floor, with handrails and wide enough to accommodate two people
  - Elevators – signs of lift capacity, earthquake or fire safety, door reopening button and emergency alarm/telephone
  - Green space – free of glass, with good visibility and good paving conditions
- Gain framed message: a message that is focused on the benefits if adopting physical activity (e.g. If you are physically active, you will live longer)
- Loss framed message: a message that is focused on the costs of not adopting he behaviour (e.g. Physical inactivity can lead to cardiovascular diseases)
- Printed materials: any printed media (brochures, leaflets, posters) that contains at least one sentence about physical activity health benefits, or physical activity recommendations, or advice about ways to be physically active.

**NA** = non applicable; this could be due the hospital/clinic has only one floor
**UTD** = unable to determine
**#** = number of posters observed
ANALYSIS
Frequency counts can be obtained to determine the proportion of clinics that have available, accessible, visible, clean, and safe stairs and the proportion of stairs that are the principal means of vertical travel. The same procedure can be followed for the elevators and green area data.

SCORING
If a more quantitative approach is needed, composite scores can be created. A disadvantage of this approach is that clinics that do not have green areas or stairs automatically have a lower score.

• For Part A, an overall composite score for clinic built environment can be created.
  o Stairs: the sum of the numbers in each indicator will be the score. The higher the score, the more PA friendly the environment
  o Green spaces: the sum of the numbers in each indicator will be the score. The higher the score, the more PA friendly the environment
  o Elevators: the sum of the numbers in each indicator will be the score. The higher the score, the less PA friendly the environment. This score can be coded as negative.
  o The sum of the stairs score and the green space score minus the elevator score will represent the overall built environment score for the clinic.

• For part B, an overall composite score for clinic PA promotion can be created.
  o Main room: the sum of the numbers in each item will be the score. The higher the score, the more PA promotion in the clinic
  o Waiting room: the sum of the numbers in each item will be the score. The higher the score, the more PA promotion in the clinic
### APPENDIX D

**Training Course Outline**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Duration</th>
<th>Content</th>
<th>Objectives</th>
<th>Activities/BCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Physical activity and health</td>
<td>20 minutes</td>
<td>- Benefits of physical activity                                         - Get familiar with the evidence about the health benefits of physical activity</td>
<td>- Power point presentation (20 min) - Behavior change strategy (BCS): provide information about benefits of physical activity and consequences of inactivity.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>- Risks of physical inactivity</td>
<td>- Identify physical inactivity as a public health problem in Mexico</td>
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<tr>
<td></td>
<td></td>
<td>- Physical activity and obesity</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>- Physical activity in Mexico</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Physical activity promotion in primary care</td>
<td>40 minutes</td>
<td>- Why to should physical activity be promoted in primary care?            - Understand the importance of physical activity counseling for public health</td>
<td>- Power point presentation (30 min) - Group discussion (10 min)</td>
<td>- BCT: provide information about benefits of promoting physical activity in primary care and provide information about others actions and approval</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Evidence about physical activity counseling strategies in primary care</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Current physical activity promotion models in primary care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Physical activity counseling</td>
<td>1 hour</td>
<td>- The 5-As model</td>
<td>- Learn the 5 As model for offering brief physical activity counseling</td>
<td>- Power point presentation (20 min) - 5-As practice in pairs (20 min) - Group discussion (10 min) - Break (10 min) - BCT: provide instruction on the behavior</td>
</tr>
<tr>
<td>methods</td>
<td></td>
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<tr>
<td>-----------------</td>
<td></td>
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</tr>
<tr>
<td><strong>4. Physical activity prescription principles</strong></td>
<td></td>
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</tr>
<tr>
<td>1 hour</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Physical activity risk evaluation</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>- Physical activity guidelines</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>- The FITT (frequency, intensity, type and time) principle</td>
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<td></td>
</tr>
<tr>
<td>- Use of the physical activity written prescription</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Referrals for connecting patients with physical activity resources in the community</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Learn and apply the principles of physical activity counseling</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Learn and apply the physical activity counseling protocol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Power point presentation (20 min)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Clinical case example (10 min)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 5-As practice in pairs with the inclusion of the FITT principle (20 min)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Q &amp; A (10 min)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- BCT: provide instruction on the behavior (practice)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**APPENDIX E**

Training Course Slides

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**Curso de Capacitación en Actividad Física**

Dra. Edtna Jáuregui Ulloa  
Secretaría de Salud Jalisco

Karla Galaviz  
Queen’s University

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**Definiciones**

<table>
<thead>
<tr>
<th>Actividad Física</th>
<th>Ejercicio</th>
<th>Fitness</th>
<th>Deporte</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Movimiento corporal producido por los músculos esqueléticos que resulta en un consumo de energía</td>
<td>• Actividad física planeada, estructurada y repetitiva enfocada a mejorar o mantener la condición física (fítness)</td>
<td>• Habilidad para llevar a cabo las actividades diarias, cubrir las demandas físicas y atender a exigencias físicas inesperadas</td>
<td>• Actividad física reglamentada, oficial, federada y con fines competitivos</td>
</tr>
</tbody>
</table>

**Beneficios de la actividad física**

<table>
<thead>
<tr>
<th>Beneficios</th>
<th>Mecanismos biológicos</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mejora la salud cardiovascular</td>
<td>Motilidad arterial, perfil lipídico, barras y presorreactores, modulación de hormonas contrarreguladoras (Adrenalina, cortisol)</td>
</tr>
<tr>
<td>Reduce el riesgo de cáncer de colon</td>
<td>Incremento de la prostaglandina alfa F2, la cual incrementa la motilidad intestinal</td>
</tr>
<tr>
<td>Reduce el riesgo de enfermedades metabólicas</td>
<td>Promueve el transporte de la glucosa a la célula, incremento de receptores GLUT 1, GLUT 4</td>
</tr>
<tr>
<td>Mejora la salud musculoesquelética</td>
<td>Promueve el equilibrio, mejora la salud ósea y la masa muscular, promueve la independencia</td>
</tr>
<tr>
<td>Control de peso</td>
<td>Incrementa el gasto energético, reduce la masa grasa, incrementa masa muscular, enzimas</td>
</tr>
<tr>
<td>Mejora la salud mental</td>
<td>Induce cambios en las concentraciones de monoaminas y endorfinas, incrementa melanización y conexiones interneurales</td>
</tr>
<tr>
<td>Mejora la calidad de vida</td>
<td>Cognitivos, física y emocional</td>
</tr>
</tbody>
</table>

---

**Beneficios de la actividad física**

![Diagrama de beneficios de la actividad física](attachment:Diagrama.png)

**Aerobics Center Longitudinal Study**


**Warburton et al., 2006**

---

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Riesgos de la inactividad física

Porcentajes de aumento de los factores de riesgo para la salud, comparados con gente activa:

- Accidente cardíaco: 270%
- Diabetes: 160%
- Ciertas formas de cáncer: 100%
- Enfermedades del corazón: 70%
- Enfermedades respiratorias: 60%

Cuarta causa de muerte en el mundo

El problema de la inactividad en México

- 40% de los adultos mexicanos son inactivos
- 72% presentan sobrepeso u obesidad
- La diabetes es la causa #1 de muertes en el país

Por qué cansa la inamovilidad y sedentarismo?

- Cansancio por esfuerzo físico
  - Depósito de depósitos energéticos para el ejercicio
  - Acumulación de ácidos lácteos
- Cansancio por inactividad
  - Dismal circulación sanguínea
  - Dismal oxigenación
  - Dismal focalización del trabajo muscular a espaldas bajas
  - Dismal afectación de los propioceptores sensoriales

¿Qué implicaciones en la salud tiene el mantenerse sedentario?

El mantenerse por tiempos prolongados sentado se asocia con mayor riesgo de mortalidad independientemente de la actividad física que realicen en su tiempo libre.

Por lo que se recomienda pararse constantemente.
¿Porque en atención primaria?

- Los pacientes inactivos pueden ser alcanzados
- Los pacientes son receptivos a las recomendaciones en salud
- Paradigma preventivo
- Es barato y efectivo

¿Porque el médico?

- Tienen una posición única para asistir y motivar a los pacientes
- Son vistos como una fuente confiable de conocimiento en salud
- Los pacientes escuchan y esperan recomendaciones de su parte

¿Qué puede hacer el médico?

- Ofrecer consulta de actividad física
- Ofrecer prescripciones de actividad física
- Referir a pacientes a recursos de actividad física

Cual es el impacto?

Los mayores beneficios de la actividad física en la salud ocurren cuando personas inactivas se convierten activas.

La consulta y prescripción de actividad física en atención primaria incrementa significativamente los niveles de actividad de pacientes sedentarios hasta por 12 meses (Orrow et al., 2012)

El referir pacientes a recursos relacionados con actividad física aumenta significativamente sus niveles de actividad física a corto plazo (Morgan 2008)

El ofrecer consulta, prescripción y referir a pacientes mejora sus niveles de actividad física a corto plazo (Fortier et al., 2011)
Quiénes aprueban esta estrategia?

Exercise is Medicine
USA

PAC
Canadá

Green prescription
Nueva Zelanda

ERS
Inglaterra

PAR
Suiza

Active Practice
Australia

Que se esta haciendo en el mundo?

Resultados de la Encuesta en Jalisco

- 400 unidades medicas fueron seleccionadas aleatoriamente
- 664 médicos de Jalisco fueron encuestados

<table>
<thead>
<tr>
<th>Region Sanitaria</th>
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<tr>
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<td>Guadalajara</td>
<td>97</td>
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<tr>
<td>Total</td>
<td>662</td>
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Que se esta haciendo en México?

Resultados de la Encuesta en Jalisco

- 80% pregunta sobre actividad física
- 18% refiere a sus pacientes
- 18% prescribe actividad física
- 50% cree que sus pacientes no siguen la prescripción
- Falta de entrenamiento y tiempo fueron las barreras principales

Modulo III
La consulta de actividad física
Recomendaciones

<table>
<thead>
<tr>
<th>Averiguar</th>
<th>La consulta puede ser breve (3 min) y compartida por varios profesionales</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Los pacientes deben ser participantes activos en las decisiones</td>
</tr>
<tr>
<td></td>
<td>Recomendaciones personalizadas y el seguimiento son críticos</td>
</tr>
<tr>
<td></td>
<td>Para promover el mantenimiento, se deben integrar estrategias comunitarias</td>
</tr>
<tr>
<td>Estabrooks et al., 2003</td>
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</table>

Modelo de las 5-As

- **Averiguar**
  - Cuales son los niveles de actividad física del paciente?
  - Cuales son los riesgos y contraindicaciones de actividad física en el paciente?
  - Que sabe el paciente sobre actividad física?

- **Aconsejar**
  - Sobre los beneficios de la actividad física
  - Sobre los niveles adecuados de actividad física
  - Sobre los riesgos de la inactividad física

- **Acordar**
  - En la identificación de barreras para llevar a cabo el plan
  - En la identificación de recursos y programas de actividad física en la comunidad

- **Asistir**
  - Dar el plan por escrito - prescripción

- **Arreglar**
  - Se ha utilizado ampliamente para promover actividad física

Modelo de las 5-As

- • Fue desarrollado para asistir a médicos
- • Fue desarrollado para tabaquismo
- • Estudios han demostrado que es factible y efectivo
- • Se ha utilizado ampliamente para promover actividad física

Modelo de las 5-As

- ASISTIR
  - En la identificación de barreras para llevar a cabo el plan
  - En la identificación de recursos y programas de actividad física en la comunidad
  - Dar el plan por escrito - prescripción

Modelo de las 5-As

- ACORDAR
  - En la identificación de barreras para llevar a cabo el plan
  - En la identificación de recursos y programas de actividad física en la comunidad

Modelo de las 5-As

- ACONSEJAR
  - Sobre los beneficios de la actividad física
  - Sobre los niveles adecuados de actividad física
  - Sobre los riesgos de la inactividad física

Modelo de las 5-As

- AVERIGUAR
  - Cuales son los niveles de actividad física del paciente?
  - Cuales son los riesgos y contraindicaciones de actividad física en el paciente?
  - Que sabe el paciente sobre actividad física?

Modelo de las 5-As

- ESPECÍFICAS – Cual es la meta?
- MEDIBLES – Como se mide?
- ACCIÓN – Que y como se hará?
- REALISTAS – Puede el paciente?
- TIEMPO – Para cuando es la meta?
Hoja de seguimiento en la consejería en actividad física

<table>
<thead>
<tr>
<th>Razones para el Cambio</th>
<th>Barreras para no hacerlo</th>
<th>Propuesta o estrategia</th>
<th>Entorno</th>
<th>Meta</th>
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<tbody>
<tr>
<td>Interpersonales</td>
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<td>Comunidad</td>
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</table>

A quien se prescribe?
Evaluación de riesgos e historia clínica

<table>
<thead>
<tr>
<th>Riesgo Alto</th>
<th>Riesgo Medio</th>
<th>Riesgo Bajo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presenta signos y síntomas de enfermedad cardiovascular, pulmonar, metabólica o musculoesqueleática</td>
<td>Presenta 2 o más factores de riesgo para enfermedad cardiovascular, pulmonar, metabólica o musculoesqueleática</td>
<td>Personas aparentemente sanas sin factores de riesgo para enfermedad cardiovascular, pulmonar, metabólica o musculoesqueleática</td>
</tr>
</tbody>
</table>

Necesitan pruebas médicas y ejercicio supervisado

Pueden hacer actividad física de intensidad moderada

Pueden hacer cualquier actividad física

Extracción del Physical Activity Readiness Questionnaire (PAR-Q) © 2002. Canadian Society for Exercise Physiology
Principios de la prescripción

**A quien se prescribe?**
- Pacientes inactivos
- Pacientes que se beneficien de la actividad física
- Pacientes que no tengan riesgos ni contraindicaciones

**Que dosis se prescribe?**
- Las guías internacionales de actividad física

**Como se prescribe?**
- Usando el principio FITT

---

**A quien se prescribe?**

Se determina si el paciente es inactivo:
- Menos de 150 minutos por semana = inactivo
- Entre 150 y 300 minutos por semana = activo
- Mas de 300 minutos por semana = muy activo

---

**Niños 0 – 4 años**
- Los infantes menores de 1 año deben ser físicamente activos varias veces al día – particularmente a través de juego interactivo en el piso
- Los infantes de 1 a 2 años y preescolares de 3 a 4 años deben acumular por lo menos 180 minutos de actividad física de cualquier intensidad durante el día, incluyendo:
  - Una variedad de actividades en ambientes distintos
  - Actividades que desarrollan habilidades motoras
  - Progresar hacia por lo menos 60 minutos de juego-energético al llegar a los 5 años de edad
- Mas actividad física provee mayores beneficios a la salud

---

**Niños 5 a 17 años**
- Deben acumular un mínimo de 60 minutos diarios de actividad física moderada-a-vigrosa incluyendo:
  - Actividades de intensidad vigorosa 3 días a la semana
  - Actividades de fortalecimiento muscular y oseo 3 días a la semana
  - Mas actividad física provee mayores beneficios

---

**Adultos 18 a 64 años**
- Los adultos deben acumular por lo menos 150 minutos de actividad física aeróbica moderada-a-vigrosa a la semana, en sesiones de 10 minutos o más
- Es también beneficioso el agregar actividades de fortalecimiento muscular y oseo que usen grupos musculares mayores, por lo menos dos días a la semana
- Mas actividad física provee mayores beneficios

---

**Adultos mayores de 65 años**
- Los adultos mayores deben acumular por lo menos 150 minutos de actividad física aeróbica moderada-a-vigrosa a la semana, en sesiones de 10 minutos o más
- Es también beneficioso el agregar actividades de fortalecimiento muscular y oseo que usen grupos musculares mayores, por lo menos dos días a la semana
- Aquellos con movilidad pobre deben actividades física que promuevan el balance para prevenir caídas
- Mas actividad física provee mayores beneficios

---

Canadian Society for Exercise Physiology 2011
Como se prescribe? El principio FITT

**Frecuencia**
- Cuantas veces por semana

**Intensidad**
- Intensidad de la actividad física

**Tipo**
- Tipo de actividad física

**Tiempo**
- Duración de la actividad física

**Principio FITT - Frecuencia**
- La dosis respuesta es positiva – entre mas actividad física, mas beneficios
- Generalmente se recomienda 3 a 5 veces por semana
- El paciente determina esto con base en su tiempo

**Principio FITT - Intensidad**

<table>
<thead>
<tr>
<th>Prueba del habla</th>
<th>Escala de Borg*</th>
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<th>MET</th>
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<tbody>
<tr>
<td>Ligera</td>
<td>Puede hablar o cantar</td>
<td>&lt;3</td>
<td>&lt;64%</td>
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<tr>
<td>Moderada</td>
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<td>3-4</td>
<td>65-76%</td>
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<td>Dificultad para hablar</td>
<td>&gt;5</td>
<td>&gt;77%</td>
</tr>
</tbody>
</table>

*M1* 1 2 3 4 5 6 7 8 9 10
Muy fácil algo difícil muy difícil

**Principio FITT - Tiempo**
- Es la duración que deben tener las actividades físicas
- Se deben acumular por lo menos 150 minutos a la semana
- Se deben realizar periodos de mínimo 10 minutos
- Mas tiempo se traduce en mayores beneficios
Caso clínico

- Sexo femenino
- Edad 45 años
- Motivo de consulta: control de peso
- No realiza ejercicio por dolor de extremidades inferiores
- Presenta glucosa en ayunas 130 mg/dl
- Presión arterial 130/90 mmHg
- Presenta sobrepeso

Escribe en una hoja:
1. En qué le beneficiaría la actividad física a este paciente?
2. El diagnóstico y plan de actividad física de este paciente

Practica las 5-As con el FITT

**Averiguar**
- Los niveles de actividad física del paciente
- Los riesgos y las contraindicaciones del paciente

**Aconsejar**
- Los beneficios de la actividad física
- Los niveles apropiados de actividad física

**Acordar**
- Desarrollar un plan de acción
- Especificar las metas del paciente

**Asistir**
- Identificar barreras y estrategias para superarlas
- Dar al paciente una prescripción

**Arreglar**
- Visitas de seguimiento
- Conectar pacientes a recursos en la comunidad

Ejemplo de una prescripción

Conclusión del curso

La actividad física previene las enfermedades crónicas que aquejan a México

La promoción de actividad física en atención primaria es efectiva y recomendada por expertos y organizaciones internacionales

El modelo de las 5-As es un protocolo efectivo para organizar la consulta de actividad física

La prescripción de actividad física debe estar basada en el principio FITT

Sesión de preguntas

Gracias!

No olviden llenar el cuestionario final
APPENDIX F

Manuscript 3 Physician Questionnaires

CUESTIONARIO DE PRESCRIPCIÓN DE LA ACTIVIDAD FÍSICA
PRE-CURSO

Antes de comenzar, por favor crea tu número de identificación personal (compuesto por las 3 primeras letras de tu primer apellido y los últimos 4 dígitos tu número telefónico). Este número será usado para identificar tu cuestionario durante este estudio y en caso de que desees retirar tus datos.

NIP:

Fecha de la capacitación ____________    Lugar ______________________

1. ¿En qué hospital/centro de salud trabajas?________________________________________

2. ¿Cual es tu puesto allí?_______________________________________________________

3. ¿En qué municipio se encuentra tu hospital/centro de salud?____________________

4. ¿A qué tipo de población pertenece?  □ Rural    □ Urbana

5. ¿Cuál es tu especialidad médica?_______________________________________________

6. ¿Cuántos años de práctica médica profesional tienes?

7. Género    □ Femenino    □ Masculino

8. Fecha de nacimiento ________________________________________________________

9. Por favor, indica que tan frecuentemente realizas cada una de las siguientes actividades como parte de tu práctica médica regular:

   a) Preguntas a tus pacientes sobre sus niveles de actividad física

   b) Le das a tus pacientes direcciones verbales para un programa de actividad física

   c) Le das a tus pacientes direcciones escritas para un programa de actividad física

   b) Evalúas el fitness de tus pacientes
como parte de un examen físico
o a través de una prueba física

c) **Refieres** a tus pacientes a profesionales
de la actividad física

10. ¿**Prescribes tu actividad física a tus pacientes?**

   ☐ SI    ☐ NO (por favor pasa a la pregunta 13)

11. ¿**Cuál es la naturaleza de la prescripción de actividad física que ofreces?** Por favor da un breve ejemplo.

12. ¿**En qué situaciones prescribes actividad física?**

13. ¿**Has recibido entrenamiento sobre la prescripción de actividad física?**

   ☐ No    ☐ Si  (por favor describe el tipo de entrenamiento)

14. **Por favor, selecciona la barrera(s) que te impide prescribir actividad física a tus pacientes (selecciona todas las que apliquen):**

   ☐ No tengo tiempo    ☐ No sé cómo prescribir actividad física
   ☐ No me pagan por hacerlo  ☐ No creo que puedo prescribir actividad física
   ☐ Los pacientes no siguen la prescripción  ☐ Otra (por favor especifica)______________
15. ¿Ofrece consulta de actividad física a tus pacientes?

☐ Sí  ☐ No (por favor pasa a la pregunta 18)

16. ¿Cuál es la naturaleza de la consulta de actividad física que ofreces? Por favor da un breve ejemplo.


17. ¿En qué situaciones das consulta de actividad física?


18. ¿Has recibido entrenamiento para dar consulta de actividad física?

☐ No  ☐ Sí (por favor describe el tipo de entrenamiento)


19. Por favor, selecciona la barrera(s) que te impide dar consulta de actividad física a tus pacientes (selecciona todas las que apliquen):

☐ No tengo tiempo  ☐ No sé cómo dar consulta de actividad física
☐ No me pagan por hacerlo  ☐ No creo que puedo dar consulta
☐ Los pacientes no siguen la consulta  ☐ Otra (por favor especifica)________________

20. ¿Refieres a tus pacientes a recursos de actividad física en su comunidad?

☐ Sí  ☐ No (por favor pasa a la pregunta 23)

21. ¿Cuáles son los recursos de actividad física a los que refieres a tus pacientes?


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22. ¿En qué situaciones refieres a tus pacientes a recursos de actividad física?


23. ¿Has recibido entrenamiento sobre cómo referir a tus pacientes a recursos de actividad física?

☐ No    ☐ Si (por favor describe el tipo de entrenamiento)


24. Por favor, selecciona la barrera (s) que te impide dar consulta de actividad física a tus pacientes (selecciona todas las que apliquen):

☐ No tengo tiempo  ☐ No sé cómo referir a mis pacientes
☐ No me pagan por hacerlo  ☐ No creo que puedo referir a mis pacientes
☐ Los pacientes no siguen la referencia  ☐ Otra (por favor especifica)________________

25. Los siguientes enunciados son sobre actitudes relacionadas con la prescripción de actividad física. Por favor encierra el número que mejor represente tu situación en cada enunciado.

a) Creo que el **prescribir** actividad física para promover la salud de mis pacientes es generalmente:

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<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<tbody>
<tr>
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<td>Innecesario</td>
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</tbody>
</table>
b) Dentro de los próximos 6 meses, mi intención es el **prescribir** actividad física a mis pacientes para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

c) Dentro de los próximos 6 meses, me gustaría **prescribir** actividad física a mis pacientes para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

d) Dentro de los próximos 6 meses, planeo **prescribir** actividad física a mis pacientes para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

e) La mayoría de los médicos estarían de acuerdo en **prescribir** actividad física para promover la salud de los pacientes

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

f) En general, me siento bajo presión para **prescribir** actividad física a mis pacientes para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

g) Personas que son importantes para mí piensan que yo debería **prescribir** actividad física a mis pacientes para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

h) El Colegio de Médicos AC aprobaría la **prescripción** de actividad física para promover la salud de los pacientes

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

i) El **prescribir** actividad física a mis pacientes es:

Muy fácil 1 2 3 4 5 6 7 Muy difícil

j) Me siento confiado de que podría **prescribir** actividad física a mis pacientes si así lo quisiera

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo
k) Existen factores fuera de mi control que me impiden **prescribir** actividad física a mis pacientes

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

l) Tengo completo control sobre el **prescribir** o no prescribir actividad física a mis pacientes

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

m) **¿Que tan probable es que tu prescribas** actividad física a tus pacientes en los próximos 6 meses?

Muy probable 1 2 3 4 5 6 7 Poco probable

26. Los siguientes enunciados son sobre actitudes relacionadas con la **consulta** de actividad física. Por favor encierra el número que mejor represente tu situación en cada enunciado.

a) Creo que la **consulta** actividad física para promover la salud de mis pacientes es generalmente:

Buena práctica médica 1 2 3 4 5 6 7 Mala práctica médica

Útil 1 2 3 4 5 6 7 Inútil

Apropiado 1 2 3 4 5 6 7 Inapropiado

Necesario 1 2 3 4 5 6 7 Innecesario

b) Dentro de los próximos 6 meses, mi intención es dar **consulta** actividad física a mis pacientes para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

c) Dentro de los próximos 6 meses, me gustaría dar **consulta** de actividad física a mis pacientes para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

d) Dentro de los próximos 6 meses, planeo dar **consulta** de actividad física a mis pacientes para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo
e) La mayoría de los médicos estarían de acuerdo en dar consulta de actividad física para promover la salud de los pacientes

Completamente de acuerdo  1  2  3  4  5  6  7  Completamente en desacuerdo

f) En general, me siento bajo presión para dar consulta de actividad física a mis pacientes para promover su salud

Completamente de acuerdo  1  2  3  4  5  6  7  Completamente en desacuerdo

g) Personas que son importantes para mí piensan que yo debería dar consulta de actividad física a mis pacientes para promover su salud

Completamente de acuerdo  1  2  3  4  5  6  7  Completamente en desacuerdo

h) El Colegio de Médicos AC aprobaría la consulta de actividad física para promover la salud de los pacientes

Completamente de acuerdo  1  2  3  4  5  6  7  Completamente en desacuerdo

i) Dar consulta de actividad física a mis pacientes es:

Muy fácil  1  2  3  4  5  6  7  Muy difícil

j) Me siento confiado de que podría dar consulta de actividad física a mis pacientes si así lo quisiera

Completamente de acuerdo  1  2  3  4  5  6  7  Completamente en desacuerdo

k) Existen factores fuera de mi control que me impiden dar consulta de actividad física a mis pacientes

Completamente de acuerdo  1  2  3  4  5  6  7  Completamente en desacuerdo

l) Tengo completo control sobre el dar o no consulta de actividad física a mis pacientes

Completamente de acuerdo  1  2  3  4  5  6  7  Completamente en desacuerdo

m) ¿Que tan probable es que des consulta de actividad física a tus pacientes en los próximos 6 meses?

Muy probable  1  2  3  4  5  6  7  Poco probable
27. Los siguientes enunciados son sobre actitudes relacionadas con referir a pacientes. Por favor encierra el número que mejor represente tu situación en cada enunciado.

a) Creo que el referir a mis pacientes a recursos de actividad física para promover su salud es generalmente:

<table>
<thead>
<tr>
<th>Opinión</th>
<th>1</th>
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b) Dentro de los próximos 6 meses, mi intención es el referir a mis pacientes a recursos de actividad física para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

c) Dentro de los próximos 6 meses, me gustaría referir a mis pacientes a recursos de actividad física para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

d) Dentro de los próximos 6 meses, planeo referir a mis pacientes a recursos de actividad física para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

e) La mayoría de los médicos estarían de acuerdo en referir a pacientes a recursos de actividad física para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

f) En general, me siento bajo presión para referir a mis pacientes a recursos de actividad física para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

g) Personas que son importantes para mí piensan que yo debería referir a mis pacientes a recursos de actividad física para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo
h) El Colegio de Médicos AC aprobaría el referir a mis pacientes a recursos de actividad física para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

i) El referir a mis pacientes a recursos de actividad física es:

Muy fácil 1 2 3 4 5 6 7 Muy difícil

j) Me siento confiado de que podría referir a mis pacientes a recursos de actividad física si así lo quisiera

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

k) Existen factores fuera de mi control que me impiden referir a mis pacientes a recursos de actividad física

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

l) Tengo completo control sobre el referir o no referir a mis pacientes a recursos de actividad física

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

m) ¿Qué tan probable es que tu refieras a tus pacientes a recursos de actividad física en los próximos 6 meses?

Muy probable 1 2 3 4 5 6 7 Poco probable

---

Las siguientes preguntas conciernen al conocimiento general sobre actividad física.

28. ¿Conoces las guías internacionales de actividad física?

☐ SI ☐ NO (por favor pasa a la pregunta 30)

29. Por favor, llena los espacios. Las guías internacionales de actividad física recomiendan que:

- Para beneficios en salud, los niños y jóvenes entre 5 y 17 años de edad deben acumular por lo menos ___________ minutos de actividad física de intensidad moderada-a-vigorosa a cada día.
• Para beneficios en salud, los adultos entre 18 y 64 años de edad deben acumular por lo menos _________ minutos de actividad física de intensidad moderada-a-vigorosa a la semana en periodos de por lo menos ________ minutos o más.
• Para beneficios en salud, los adultos de 65 años o más deben acumular por lo menos _________ minutos de actividad física de intensidad moderada-a-vigorosa a la semana en periodos de por lo menos ________ minutos o más.

30. ¿Conoces el principio FITT (frecuencia, intensidad, tipo y tiempo) para la prescripción de actividad física?

☐ SI ☐ NO (por favor ve a la pregunta 32)

31. Describe cada elemento del principio FITT para la prescripción de la actividad física:
- Frecuencia: ________________________________
- Intensidad: ________________________________
- Tipo: ________________________________
- Tiempo: ________________________________

32. ¿Conoces las diferentes intensidades de la actividad física?

☐ SI (por favor escríbelas en el recuadro) ☐ NO

33. Clasifica cada uno de los siguientes enunciados como cierto o falso:

a) La actividad física es beneficial solamente si es de intensidad vigorosa
   Cierto ☐ Falso ☐

b) Cualquier intensidad de actividad física es beneficial
   Cierto ☐ Falso ☐

c) Los mayores beneficios de la actividad física son vistos cuando las personas inactivas se hacen por lo menos ligeramente activas
   Cierto ☐ Falso ☐
34. Por favor, escribe tu email para participar en la rifa del Ipad y para el envio del proximo cuestionario:

______________________________

Gracias por completar este cuestionario!
CUESTIONARIO DE PRESCRIPCIÓN DE LA ACTIVIDAD FÍSICA
POST-CURSO

Antes de comenzar, por favor crea tu número de identificación personal (compuesto por las 3 primeras letras de tu primer apellido y los últimos 4 dígitos tu número telefónico). Este número será usado para identificar tu cuestionario durante este estudio y en caso de que desees retirar tus datos.

NIP:

Fecha de la capacitación _________________  Lugar ______________________

1. Los siguientes enunciados son sobre actitudes relacionadas con la prescripción de actividad física. Por favor encierra el número que mejor represente tu situación en cada enunciado.

   a) Creo que el **prescribir** actividad física para promover la salud de mis pacientes es
generalmente:

   Buena práctica médica 1 2 3 4 5 6 7  Mala práctica médica

   Útil 1 2 3 4 5 6 7  Inútil

   Apropiado 1 2 3 4 5 6 7  Inapropiado

   Necesario 1 2 3 4 5 6 7  Innecesario

   b) Dentro de los próximos 6 meses, mi intención es el **prescribir** actividad física a mis pacientes
   para promover su salud

   Completamente de acuerdo 1 2 3 4 5 6 7  Completamente en desacuerdo

   c) Dentro de los próximos 6 meses, me gustaría **prescribir** actividad física a mis pacientes para
   promover su salud

   Completamente de acuerdo 1 2 3 4 5 6 7  Completamente en desacuerdo

   d) Dentro de los próximos 6 meses, planeo **prescribir** actividad física a mis pacientes para
   promover su salud

   Completamente de acuerdo 1 2 3 4 5 6 7  Completamente en desacuerdo

   e) La mayoría de los médicos estarían de acuerdo en **prescribir** actividad física para promover la
   salud de los pacientes

   Completamente de acuerdo 1 2 3 4 5 6 7  Completamente en desacuerdo
f) En general, me siento bajo presión para **prescribir** actividad física a mis pacientes para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

g) Personas que son importantes para mí piensan que yo debería **prescribir** actividad física a mis pacientes para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

h) El Colegio de Médicos AC aprobaría la **prescripción** de actividad física para promover la salud de los pacientes

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

i) El **prescribir** actividad física a mis pacientes es:

Muy fácil 1 2 3 4 5 6 7 Muy difícil

j) Me siento confiado de que podría **prescribir** actividad física a mis pacientes si así lo quisiera

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

k) Existen factores fuera de mi control que me impiden **prescribir** actividad física a mis pacientes

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

l) Tengo completo control sobre el **prescribir** o no prescribir actividad física a mis pacientes

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

m) ¿Qué tan probable es que tu **prescribas** actividad física a tus pacientes en los próximos 6 meses?

Muy probable 1 2 3 4 5 6 7 Poco probable

2. Los siguientes enunciados son sobre actitudes relacionadas con la consulta de actividad física. Por favor encierra el número que mejor represente tu situación en cada enunciado.

a) Creo que **la consulta** actividad física para promover la salud de mis pacientes es generalmente:

Buena práctica médica 1 2 3 4 5 6 7 Mala práctica médica

Útil 1 2 3 4 5 6 7 Inútil
Apropiado  1  2  3  4  5  6  7  Inapropiado

Necesario  1  2  3  4  5  6  7  Innecesario

b) Dentro de los próximos 6 meses, mi intención es dar consulta actividad física a mis pacientes para promover su salud

Completamente de acuerdo  1  2  3  4  5  6  7  Completamente en desacuerdo

c) Dentro de los próximos 6 meses, me gustaría dar consulta de actividad física a mis pacientes para promover su salud

Completamente de acuerdo  1  2  3  4  5  6  7  Completamente en desacuerdo

d) Dentro de los próximos 6 meses, planeo dar consulta de actividad física a mis pacientes para promover su salud

Completamente de acuerdo  1  2  3  4  5  6  7  Completamente en desacuerdo

e) La mayoría de los médicos estarían de acuerdo en dar consulta de actividad física para promover la salud de los pacientes

Completamente de acuerdo  1  2  3  4  5  6  7  Completamente en desacuerdo

f) En general, me siento bajo presión para dar consulta de actividad física a mis pacientes para promover su salud

Completamente de acuerdo  1  2  3  4  5  6  7  Completamente en desacuerdo

g) Personas que son importantes para mí piensan que yo debería dar consulta de actividad física a mis pacientes para promover su salud

Completamente de acuerdo  1  2  3  4  5  6  7  Completamente en desacuerdo

h) El Colegio de Médicos AC aprobaría la consulta de actividad física para promover la salud de los pacientes

Completamente de acuerdo  1  2  3  4  5  6  7  Completamente en desacuerdo

i) Dar consulta de actividad física a mis pacientes es:

Muy fácil  1  2  3  4  5  6  7  Muy difícil
j) Me siento confiado de que podría dar consulta de actividad física a mis pacientes si así lo quisiera

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

k) Existen factores fuera de mi control que me impiden dar consulta de actividad física a mis pacientes

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

l) Tengo completo control sobre el dar o no consulta de actividad física a mis pacientes

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

m) ¿Que tan probable es que des consulta de actividad física a tus pacientes en los próximos 6 meses?

Muy probable 1 2 3 4 5 6 7 Poco probable

3. Los siguientes enunciados son sobre actitudes relacionadas con referir a pacientes. Por favor encierra el número que mejor represente tu situación en cada enunciado.

a) Creo que el referir a mis pacientes a recursos de actividad física para promover su salud es generalmente:

Buena práctica médica 1 2 3 4 5 6 7 Mala práctica médica

Útil 1 2 3 4 5 6 7 Inútil

Apropiado 1 2 3 4 5 6 7 Inapropiado

Necesario 1 2 3 4 5 6 7 Innecesario

b) Dentro de los próximos 6 meses, mi intención es el referir a mis pacientes a recursos de actividad física para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

c) Dentro de los próximos 6 meses, me gustaría referir a mis pacientes a recursos de actividad física para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo
d) Dentro de los próximos 6 meses, planeo referir a mis pacientes a recursos de actividad física para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

e) La mayoría de los médicos estarían de acuerdo en referir a pacientes a recursos de actividad física para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

f) En general, me siento bajo presión para referir a mis pacientes a recursos de actividad física para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

g) Personas que son importantes para mí piensan que yo debería referir a mis pacientes a recursos de actividad física para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

h) El Colegio de Médicos AC aprobaría el referir a mis pacientes a recursos de actividad física para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

i) El referir a mis pacientes a recursos de actividad física es:

Muy fácil 1 2 3 4 5 6 7 Muy difícil

j) Me siento confiado de que podría referir a mis pacientes a recursos de actividad física si así lo quisiera

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

k) Existen factores fuera de mi control que me impiden referir a mis pacientes a recursos de actividad física

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

l) Tengo completo control sobre el referir o no referir a mis pacientes a recursos de actividad física

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo
¿Que tan probable es que tu refieras a tus pacientes a recursos de actividad física en los próximos 6 meses?

Muy probable 1 2 3 4 5 6 7 Poco probable

Las siguientes preguntas conciernen al conocimiento general sobre actividad física.

4. ¿Conoces las guías internacionales de actividad física?

☐ SI ☐ NO (por favor pasa a la pregunta 6)

5. Por favor, llena los espacios. Las guías internacionales de actividad física recomiendan que:

• Para beneficios en salud, los niños y jóvenes entre 5 y 17 años de edad deben acumular por lo menos __________ minutos de actividad física de intensidad moderada-a-vigorosa a cada día.

• Para beneficios en salud, los adultos entre 18 y 64 años de edad deben acumular por lo menos __________ minutos de actividad física de intensidad moderada-a-vigorosa a la semana en períodos de por lo menos __________ minutos o más.

• Para beneficios en salud, los adultos de 65 años o más deben acumular por lo menos __________ minutos de actividad física de intensidad moderada-a-vigorosa a la semana en períodos de por lo menos __________ minutos o más.

6. ¿Conoces el principio FITT (frecuencia, intensidad, tipo y tiempo) para la prescripción de actividad física?

☐ SI ☐ NO (por favor ve a la pregunta 8)

7. Describe cada elemento del principio FITT para la prescripción de la actividad física:

-Frecuencia: ___________________________________________________________________

-Intensidad: ___________________________________________________________________

-Tipo: __________________________________________________________________________

-Tiempo: _________________________________________________________________________
8. ¿Conoces las diferentes intensidades de la actividad física?

☐ SI (por favor eséibelas en el recuadro)    ☐ NO

9. Clasifica cada uno de los siguientes enunciados como cierto o falso:

<table>
<thead>
<tr>
<th>enunciado</th>
<th>Cierto</th>
<th>Falso</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) La actividad física es beneficíolamente si es de intensidad vigorosa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Cualquier intensidad de actividad física es beneficíol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Los mayores beneficios de la actividad física son vistos cuando las personas inactivas se hacen por lo menos ligeramente activas</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10. Las siguientes preguntas están relacionadas con tus niveles de actividad física.

a) Piensa en todas las actividades vigorosas que realizaste en los últimos 7 días. Actividades vigorosas son aquellas que requieren un esfuerzo físico intenso que te hace respirar mucho más rápido de lo normal y que hacen a tu corazón latir muy rápido. Piensa solo en aquellas actividades que duraron por lo menos 10 minutos por sesión.

Durante los últimos 7 días ¿en cuántos días realizaste actividades físicas vigorosas tales como levantar cosas pesadas, correr o nadar?

Veces por semana _______

¿Cuánto duraron estas sesiones?

☐ 10-15 minutos
☐ De 16 a 30 minutos
☐ De 31 minutos a 1 hora
☐ Más de 1 hora
☐ No lo se

b) Ahora, piensa en todas las actividades físicas moderadas que realizaste en los últimos 7 días. Actividades físicas moderadas son aquellas que requieren un esfuerzo físico mediano y que te hacen respirar un poco más intenso de lo normal. Piensa solo en aquellas actividades que duraron por lo menos 10 minutos por sesión.
Durante los últimos 7 días ¿en cuántos días realizaste actividades físicas moderadas tales como andar en bicicleta, jugar baseball o subir escaleras? No incluyas caminar.

Veces por semana _______.
¿Cuánto duraron estas sesiones?

☐ 10-15 minutos
☐ De 16 a 30 minutos
☐ De 31 minutos a 1 hora
☐ Más de 1 hora
☐ No lo se

c) Ahora, piensa en todas las actividades físicas ligeras que realizaste en los últimos 7 días. Actividades físicas ligeras son aquellas que requieren un esfuerzo físico mínimo como por ejemplo caminar, hacer jardinería o limpiar.
Durante los últimos 7 días ¿en cuántos días realizaste actividades físicas ligeras?

Veces por semana _______.
¿Cuánto duraron estas sesiones?

☐ 10-15 minutos
☐ De 16 a 30 minutos
☐ De 31 minutos a 1 hora
☐ Más de 1 hora
☐ No lo se

Las siguientes preguntas son sobre el contenido y la calidad de la sesión de capacitación.

12. Esta sesión duró: _________ horas y ________ minutos

13. Los temas cubiertos en esta sesión incluyeron (selecciona todos los que apliquen):

☐ Módulo 1
☐ Módulo 2
☐ Módulo 3
☐ Módulo 4
☐ AF y Salud
☐ AF en atención primaria
☐ El modelo de las 5-As
☐ EL principio FITT

14. Los recursos utilizados durante la sesión incluyeron (selecciona todos los que apliquen):

☐ Platica
☐ Discusión grupal
☐ Práctica
☐ Materiales impresos

15. Por favor califica la calidad de esta sesión. En general, la calidad de esta sesión fue:

☐ Mala
☐ Promedio
☐ Buena
☐ Excelente
16. Por favor califica la credibilidad de la información presentada en esta sesión. La información presentada en esta sesión fue:

Muy increíble □  Incrédible □  Creíble □  Muy creíble □

17. Por favor califica que tan útil es la información presentada en esta sesión para tu práctica médica. La información presentada en esta sesión es:

Muy inútil □  Inútil □  Útil □  Muy útil □

Comentarios:

11. Por favor, escribe tu email para participar en la rifa del Ipad y para el envío del próximo cuestionario:

______________________________

Gracias por completar este cuestionario!
CUESTIONARIO DE PRESCRIPCIÓN DE LA ACTIVIDAD FÍSICA
SEGUIMIENTO

Antes de comenzar, por favor ingresa el número de identificación personal que creaste para el cuestionario (el NIP compuesto por las 3 primeras letras de tu primer apellido y los últimos 4 dígitos tu número telefónico). Este número será usado para identificar tu cuestionario durante este estudio y en caso de que desees retirar tus datos.

NIP:

Fecha de la capacitación: ____________________  Lugar: ____________________

Clínica de trabajo: ____________________  Región: ____________________

1. Por favor, indica que tan frecuentemente realizas cada una de las siguientes actividades como parte de tu práctica médica regular:

   a) **Preguntas** a tus pacientes sobre sus niveles de actividad física
      **Siempre**  **Usualmente**  **Ocasionalmente**  **Raramente**  **Nunca**

   b) Le das a tus pacientes direcciones **verbales** para un programa de actividad física
      **Siempre**  **Usualmente**  **Ocasionalmente**  **Raramente**  **Nunca**

   c) Le das a tus pacientes direcciones **escritas** para un programa de actividad física
      **Siempre**  **Usualmente**  **Ocasionalmente**  **Raramente**  **Nunca**

   b) **Evalúas** el fitness de tus pacientes como parte de un examen físico o a través de una prueba física
      **Siempre**  **Usualmente**  **Ocasionalmente**  **Raramente**  **Nunca**

   c) **Refieres** a tus pacientes a profesionales de la actividad física de la actividad física
      **Siempre**  **Usualmente**  **Ocasionalmente**  **Raramente**  **Nunca**

2. ¿**Prescribes** tu actividad física a tus pacientes?
   
   □ SI  □ NO (por favor pasa a la pregunta 4)

3. ¿Cuál es la naturaleza de la **prescripción** de actividad física que ofreces? Por favor da un breve ejemplo.

   

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4. Por favor, selecciona la barrera (s) que te impide **prescribir** actividad física a tus pacientes (selecciona todas las que apliquen):

- [ ] No tengo tiempo
- [ ] No me pagan por hacerlo
- [ ] Los pacientes no siguen la prescripción
- [ ] No sé cómo prescribir actividad física
- [ ] No creo que puedo prescribir actividad física
- [ ] Otra (por favor especifica) ______________

5. **¿Ofreces consulta de actividad física a tus pacientes?**

- [ ] Sí
- [ ] No (por favor pasa a la pregunta 7)

6. **¿Cuál es la naturaleza de la consulta de actividad física que ofreces?** Por favor da un breve ejemplo.

   

7. Por favor, selecciona la barrera (s) que te impide **dar consulta** de actividad física a tus pacientes (selecciona todas las que apliquen):

- [ ] No tengo tiempo
- [ ] No me pagan por hacerlo
- [ ] No me pagan por hacerlo
- [ ] Los pacientes no siguen la consulta
- [ ] No sé cómo dar consulta en actividad física
- [ ] No creo que puedo dar consulta
- [ ] Otra (por favor especifica) ______________

8. **¿Refieres a tus pacientes a recursos de actividad física en su comunidad?**

- [ ] Sí
- [ ] No (por favor pasa a la pregunta 10)

9. **¿Cuáles son los recursos de actividad física a los que refieres a tus pacientes?**

   

10. Por favor, selecciona la barrera (s) que te impide dar consulta de actividad física a tus pacientes (selecciona todas las que apliquen):

- [ ] No tengo tiempo
- [ ] No me pagan por hacerlo
- [ ] Los pacientes no siguen la referencia
- [ ] No sé cómo referir a mis pacientes
- [ ] No creo que puedo referir a mis pacientes
- [ ] Otra (por favor especifica) ______________
11. Los siguientes enunciados son sobre actitudes relacionadas con la prescripción de actividad física. Por favor encierra el número que mejor represente tu situación en cada enunciado.

a) Creo que el prescribir actividad física para promover la salud de mis pacientes es generalmente:

- Buena práctica médica
- Útil
- Apropiado
- Necesario

b) Dentro de los próximos 6 meses, mi intención es el prescribir actividad física a mis pacientes para promover su salud

c) Dentro de los próximos 6 meses, me gustaría prescribir actividad física a mis pacientes para promover su salud

d) Dentro de los próximos 6 meses, planeo prescribir actividad física a mis pacientes para promover su salud

e) La mayoría de los médicos estarían de acuerdo en prescribir actividad física para promover la salud de los pacientes

f) En general, me siento bajo presión para prescribir actividad física a mis pacientes para promover su salud
g) Personas que son importantes para mí piensan que yo debería **prescribir** actividad física a mis pacientes para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

h) El Colegio de Médicos AC aprobaría la **prescripción** de actividad física para promover la salud de los pacientes

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

i) El **prescribir** actividad física a mis pacientes es:

Muy fácil 1 2 3 4 5 6 7 Muy difícil

j) Me siento confiado de que podría **prescribir** actividad física a mis pacientes si así lo quisiera

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

k) Existen factores fuera de mi control que me impiden **prescribir** actividad física a mis pacientes

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

l) Tengo completo control sobre el **prescribir** o no prescribir actividad física a mis pacientes

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

m) ¿Que tan probable es que tu **prescribas** actividad física a tus pacientes en los próximos 6 meses?

Muy probable 1 2 3 4 5 6 7 Poco probable

12. Los siguientes enunciados son sobre actitudes relacionadas con la consulta de actividad física. Por favor encierra el número que mejor represente tu situación en cada enunciado.

a) Creo que la **consulta** actividad física para promover la salud de mis pacientes es generalmente:

Buena práctica médica 1 2 3 4 5 6 7 Mala práctica médica

Útil 1 2 3 4 5 6 7 Inútil

Apropiado 1 2 3 4 5 6 7 Inapropiado

Necesario 1 2 3 4 5 6 7 Innecesario
b) Dentro de los próximos 6 meses, mi intención es dar consulta actividad física a mis pacientes para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

c) Dentro de los próximos 6 meses, me gustaría dar consulta de actividad física a mis pacientes para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

d) Dentro de los próximos 6 meses, planeo dar consulta de actividad física a mis pacientes para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

e) La mayoría de los médicos estarían de acuerdo en dar consulta de actividad física para promover la salud de los pacientes

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

f) En general, me siento bajo presión para dar consulta de actividad física a mis pacientes para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

g) Personas que son importantes para mí piensan que yo debería dar consulta de actividad física a mis pacientes para promover su salud

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

h) El Colegio de Médicos AC aprobaría la consulta de actividad física para promover la salud de los pacientes

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

i) Dar consulta de actividad física a mis pacientes es:

Muy fácil 1 2 3 4 5 6 7 Muy difícil

j) Me sienta confiado de que podría dar consulta de actividad física a mis pacientes si así lo quisiera

Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo
k) Existen factores fuera de mi control que me impiden dar consulta de actividad física a mis pacientes
Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

l) Tengo completo control sobre el dar o no consulta de actividad física a mis pacientes
Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

m) ¿Qué tan probable es que des consulta de actividad física a tus pacientes en los próximos 6 meses?
Muy probable 1 2 3 4 5 6 7 Poco probable

13. Los siguientes enunciados son sobre actitudes relacionadas con referir a pacientes. Por favor encierra el número que mejor represente tu situación en cada enunciado.

a) Creo que el referir a mis pacientes a recursos de actividad física para promover su salud es generalmente:
Buena práctica médica 1 2 3 4 5 6 7 Mala práctica médica
Útil 1 2 3 4 5 6 7 Inútil
Apropiado 1 2 3 4 5 6 7 Inapropiado
Necesario 1 2 3 4 5 6 7 Innecesario

b) Dentro de los próximos 6 meses, mi intención es el referir a mis pacientes a recursos de actividad física para promover su salud
Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

c) Dentro de los próximos 6 meses, me gustaría referir a mis pacientes a recursos de actividad física para promover su salud
Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo

d) Dentro de los próximos 6 meses, planeo referir a mis pacientes a recursos de actividad física para promover su salud
Completamente de acuerdo 1 2 3 4 5 6 7 Completamente en desacuerdo
e) La mayoría de los médicos estarían de acuerdo en **referir** a pacientes a recursos de actividad física para promover su salud

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<th>Opinión</th>
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f) En general, me siento bajo presión para **referir** a mis pacientes a recursos de actividad física para promover su salud

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g) Personas que son importantes para mí piensan que yo debería **referir** a mis pacientes a recursos de actividad física para promover su salud

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h) El Colegio de Médicos AC aprobaría el **referir** a mis pacientes a recursos de actividad física para promover su salud

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i) El **referir** a mis pacientes a recursos de actividad física es:

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<tr>
<th>Fácil</th>
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<tr>
<td>Muy fácil</td>
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j) Me siento confiado de que podría **referir** a mis pacientes a recursos de actividad física si así lo quisiera

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<th>Opinión</th>
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k) Existen factores fuera de mi control que me impiden **referir** a mis pacientes a recursos de actividad física

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<th>Opinión</th>
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l) Tengo completo control sobre el **referir** o no referir a mis pacientes a recursos de actividad física

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m) ¿Qué tan probable es que tu **refieras** a tus pacientes a recursos de actividad física en los próximos 6 meses?

<table>
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<tr>
<th>Probabilidad</th>
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<tr>
<td>Muy probable</td>
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<td>Poco probable</td>
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Las siguientes preguntas conciernen al conocimiento general sobre actividad física.

14. ¿Conoces las guías internacionales de actividad física?
   - SI  - NO (por favor pasa a la pregunta 16)

15. Por favor, llena los espacios en blanco de los siguientes enunciados.

Las guías internacionales de actividad física recomiendan que:
- Para beneficios en salud, los niños y jóvenes entre 5 y 17 años de edad deben acumular por lo menos ________ minutos de actividad física de intensidad moderada-a-vigorosa a cada día.
- Para beneficios en salud, los adultos entre 18 y 64 años de edad deben acumular por lo menos ______ minutos de actividad física de intensidad moderada-a-vigorosa a la semana en periodos de por lo menos ________ minutos o más.
- Para beneficios en salud, los adultos de 65 años o más deben acumular por lo menos ________ minutos de actividad física de intensidad moderada-a-vigorosa a la semana en periodos de por lo menos ________ minutos o más.

16. ¿Conoces el principio FITT (frecuencia, intensidad, tipo y tiempo) para la prescripción de actividad física?
   - SI  - NO (por favor ve a la pregunta 18)

17. Describe cada elemento del principio FITT para la prescripción de la actividad física:
   - Frecuencia: ___________________________________________________
   - Intensidad: ___________________________________________________
   - Tipo: _________________________________________________________
   - Tiempo: _____________________________________________________

18. ¿Conoces las diferentes intensidades de la actividad física?
   - SI (por favor escribe las en el recuadro)  - NO
19. Clasifica cada uno de los siguientes enunciados como cierto o falso:

<table>
<thead>
<tr>
<th>Enunciado</th>
<th>Cierto</th>
<th>Falso</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) La actividad física es beneficia solamente si es de intensidad vigorosa</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td>b) Cualquier intensidad de actividad física es beneficia</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>c) Los mayores beneficios de la actividad física son vistos</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td>cuando las personas inactivas se hacen por lo menos ligeramente activas</td>
<td></td>
<td>☐</td>
</tr>
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</table>

20. Por favor, escribe tu correo electrónico para entrar a la rifa del Ipad:

________________________________________

¡MUCHAS GRACIAS!
APPENDIX G

Manuscript 3 Region Coordinator Questionnaire

CUESTIONARIO PARA COORDINADOR DE REGIÓN

Región Sanitaria ________________________________

I. ¿Cómo se enteró sobre el curso de capacitación sobre consulta de actividad física?
   a. Por invitación (de quien) □ _____________________________
   b. Por mandato de la secretaria □
   c. Por colegas □
   d. Otro (describa) □ _____________________________

II. ¿Cuántos médicos de su región sanitaria asistieron a las capacitaciones sobre consulta de actividad física?
   a. Número de médicos ______
   b. Ningún médico asistió □
   c. No lo se □

III. ¿Quién seleccionó a los médicos para asistir a las capacitaciones?
   a. El coordinador de la región □
   b. La secretaria □
   c. Otro (describa) □ _____________________________

IV. ¿Cómo se seleccionaron los médicos que asistieron a las capacitaciones?

V. ¿Qué criterios debían reunir los médicos para asistir a los cursos de capacitación?

VI. ¿Qué opina usted de la necesidad de integrar educación médica continua como parte de sus actividades regulares?
APPENDIX H

Manuscript 3 Process Evaluation Forms

FORMATO DE FIDELIDAD DEL CURSO – CAPACITADOR

Fecha de la sesión: ________________ Ubicación: ________________ Región: ______
Número de asistentes: ___________ Mujeres: _________________ Hombres: ______
Hora de inicio de la sesión: ___________ Hora de finalización de la sesión: ______

1. Información sobre el contenido del curso:

<table>
<thead>
<tr>
<th>Temas</th>
<th>¿Fue implementado?</th>
<th>¿Fue modificado?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sí</td>
<td>No</td>
</tr>
<tr>
<td>Módulo 1 - Beneficios de la AF</td>
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<tr>
<td>-Beneficios de AF</td>
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<tr>
<td>-Riesgos de la inactividad</td>
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<tr>
<td>-Inactividad en México</td>
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<tr>
<td>Módulo 2- AF en atención prima.</td>
<td></td>
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<tr>
<td>-Promoción de la actividad por el médico</td>
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<td>-Efectividad</td>
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<tr>
<td>-Qué se está haciendo</td>
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</table>
2. Los recursos utilizados durante la sesión incluyeron (selecciona todos los que apliquen):

Platica  □  Discusión grupal  □  Práctica  □  Materiales impresos  □

3. Por favor califica la calidad de esta sesión. En general, la calidad de esta sesión fue:

Mala  □  Promedio  □  Buena  □  Excelente  □

4. Éxito se refiere a lograr las metas planeadas para esta sesión. Con base en esto, cómo calificarías el éxito de la sesión:

Muy poco exitosa  □  Poco exitosa  □  Exitosa  □  Muy exitosa  □

Observaciones:
**FORMATO DE FIDELIDAD DEL CURSO – OBSERVADOR**

Fecha de la sesión: ________________ Ubicación: _________ Región: _____________  
Número de asistentes: ___________ Mujeres: ________ Hombres: ____________  
Hora de inicio:___________ Hora de finalización: _________ Asistentes final _______

1. Información sobre el contenido del curso:

<table>
<thead>
<tr>
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<th>Duración modulo</th>
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Módulo 1 - Beneficios de la AF  
- Beneficios de AF  
- Riesgos de la inactividad  
- Inactividad en México

Módulo 2 - AF en atención prima.  
- Promoción de la actividad por el médico  
- Efectividad  
- Qué se está haciendo

Módulo 3 – El modelo de las 5-As  
- Recomendaciones  
- Modelo de las 5-As  
- Práctica

Módulo 4 – El principio FITT  
- A quién prescribir  
- Qué prescribir  
- Cómo prescribir

2. Los recursos utilizados durante la sesión incluyeron (selecciona todos los que apliquen):
3. Por favor califica la calidad de esta sesión. En general, la calidad de esta sesión fue:

   Mala □  Promedio □  Buena □  Excelente □

4. Éxito se refiere a lograr las metas planeadas para esta sesión. Con base en esto, cómo calificarías el éxito de la sesión:

   Muy poco exitosa □  Poco exitosa □  Exitosa □  Muy exitosa □

Observaciones:

□ □ □ □