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PRIMARY CARE ASSESSMENT AND INTERVENTIONS TO IMPROVE
PHYSICAL ACTIVITY AMONG INSUFFICIENTLY ACTIVE ADULTS AGES 18
THROUGH 64 YEARS OLD

Thomas Alden Sanchez

A Dissertation Submitted to the Graduate Faculty of
GRAND VALLEY STATE UNIVERSITY

In

Partial Fulfillment of the Requirements

For the Degree of

DOCTOR OF NURSING PRACTICE

Kirkhof College of Nursing

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Dedication

To my wife Michelle, who tolerated several years of evening and weekend work to complete this dissertation and the degree that goes with it. She received a number of crunch-time requests for writing consultation and gave her fresh and enlightening perspective as a consumer and reader from outside the healthcare professions.

Acknowledgement

Dr. Cynthia Coviak patiently offered advice and hints about strategies and what to think about next over the last several years. She pointed out internal and external obstacles along the way and herded this cat to completion, which was no small task. Adam Popour, a Grand Valley State University (GVSU) Family Health Center (FHC) employee and IT student, created a software tool to calculate the MET-minutes per week and the physical activity category from the IPAQ results. He also helped create places to enter the results and links to pull PA assessment data into progress notes. He tirelessly went after technical glitches until everything worked. Eventually this work was set aside because the health center switched EHRs mid-project. Rhonda Pardue then helped me create a new IPAQ calculator in Excel by writing the complex result formula that captures all the dependent clauses of the instructions.

The current and former staff of the GVSU FHC graciously permitted me to learn and carry out my project in their working environment. MaryJo, Anne, Beth, Kathy, Kim, Ann, and Larry collaborated on the process change, helped revise working documents and showed a desire to see best practices enacted. Sarah Portenga and Nicole Hansen of the YMCA Greater Grand Rapids helped develop the processes for linking their established community programs to primary care sites. Julie Sielewa of the YMCA Greater Grand Rapids, let this DNP student into the administrative offices under her direction to find a place to make community-level connections that may become a game-changer in healthcare. The Statistical Consulting Center of GVSU headed by Dr. Sango Otieno, along with Melissa and a cadre of other students, contributed helpful ideas that were both amusing and educational.

Abstract

A number of chronic and debilitating conditions such as cardiovascular disease, stroke, hypertension, anxiety, depression, pain, osteoporosis, and falls are known to be delayed, improved, or prevented by increasing physical activity (PA) levels. The numbers of those affected form a substantial portion of the US population. As of 2011, for example, 26 million adults in the U.S. were diagnosed with diabetes mellitus (DM) alone. Another 79 million people had elevated blood glucose measurements putting them at risk for DM. Despite knowledge of the connection with chronic disease, PA levels are not consistently and quantitatively assessed during primary care office visits. Healthcare providers often believe lifestyle change intervention with sedentary adults is futile and encounter barriers to regular PA for many low-income, inner-city clients.

Barriers are potentially reduced through partnership with the YMCA (Y¹), which cooperates with local churches and community organizations to open sites that offer nutrition and exercise classes at no cost to participants. Healthcare providers at the Grand Valley State University Family Health Center (FHC) did not previously refer sedentary clients to the Y. Referral to the Y became an innovative part of an evidence-based intervention set.

Quality enhancements were put in place at the FHC, guided by a logic model to improve PA assessment and intervention. A policy was written that specifies the process to be used to evaluate and document clients' PA levels and application of interventions for those clients who were assessed and found to have suboptimal habitual PA levels. Assessment uses the International Physical Activity Questionnaire self-report, short-form

¹ The YMCA was the historic acronym for the Young Men's Christian Association, but its name is now formally the *YMCA*. The current official acronym is simply the *Y*.

because it yields numeric and categorical results that allow tracking of progress and determination of the need for PA intervention. A low to moderate PA level result now triggers implementation of an evidence-based intervention set consisting of counseling, printed educational materials, and an offer of referral to Y community outreach programs. The electronic health record-embedded educational material was written to facilitate teaching and client self-review.

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CHAPTER 1

INTRODUCTION

The purpose of this primary care (PC) quality improvement project was to provide the Grand Valley State University (GVSU) Family Health Center (FHC) nurse-managed health center with evidence-based tools and processes to assess, track, and safely intervene with insufficiently active adults ages 18 through 64 years old. Literature was reviewed to find tools for physical activity (PA) assessment and intervention that are well suited for application in PC. A software calculation tool was created to facilitate accurate assessment of PA and an agreement with the regional YMCA (Y)² organization was put in place so that FHC clients could be referred to Y community sites where exercise classes were held. An educational flyer was written for the client to reference during and after an encounter. The flyer reinforces PA as an important part of the plan of care. Documentation templates for care that addresses PA were set up and installed on the health center's electronic health record. Strategies for capturing revenue related to PA care were suggested. Finally, the new tools were integrated into a policy developed in consultation with FHC leadership and staff members to guide the PA care process and documentation of the encounter, while minimizing the impact on clinical staff workload.

PA is defined as "any body movement that works your muscles and requires more energy than resting" (National Institutes of Health [NIH], 2011). The preferred term for this type of health promotion is *physical activity* as opposed to *exercise* because it captures numerous classes of activity that might otherwise be lost to consideration (e.g. walking or cycling for transportation, occupation-related movement, household chores,

² The YMCA was the historic acronym for the Young Men's Christian Association, but its name is now formally the *YMCA*. The current official acronym is simply the *Y*.

leisure-time sports, play, games, and other activities). The definition of PA encompasses *exercise*, which is defined as planned, structured, and repetitive movement that is specifically aimed to achieve or maintain physical fitness (Garber et al., 2011). The terms *PA* and *exercise* are used interchangeably in the literature, even within individual studies. If the description of movement in a study indicates a reference to exercise, terminology describing a study's findings in this paper will stay consistent with the study or the more global term *PA* will be used.

The setting of the PC site chosen for this project was a nurse-managed health center affiliated with GVSU's Kirkhof College of Nursing. The practice is located near central Grand Rapids, Michigan, a U.S. Midwestern city with a 2012 population estimate of 190,411 (U.S. Department of Commerce, U.S. Census Bureau, 2013). The area was a historically vibrant zone that became derelict and is now experiencing gradual revitalization. Development in this neighborhood seeks to continue to accommodate homeless and low-income residents through the provision of subsidized apartments and the continued presence and support of shelters. Housing in the area for low income residents is financed largely through private donations, spearheaded by the non-profit charitable organization, the Dwelling Place (Dwelling Place, n.d.).

The mission of the GVSU Kirkhof College of Nursing practice site has been in part, to help provide access to healthcare for low income residents of the surrounding neighborhood (GVSU, 2013). Likewise, a similar mission to bring exercise, nutrition, and other health promotion programs to inner-city residents has been the focus of the Y Healthy Living Initiative (YMCA Community Outreach, 2013). This project adopted

interventions that reduce barriers and build on the nascent synergy present in the complementary missions of these two organizations.

The project's PA intervention set included referral to the Y regional organization, which has worked to deliver a variety of popular PA formats out in the community. Since 2011, the Y affiliate in Grand Rapids, Michigan provided health programming in partnership with local agencies. The Y successfully extended its wellness-focused *Healthy Living* community outreach to *hub sites* that involve partnerships with local churches, schools, and non-profit groups in low income areas of the city. The strategic placement of professional trainers, at convenient times, in underutilized gymnasiums and meeting places in low income neighborhoods is one way the Y addressed perceived barriers to engagement in PA. Barriers discussed in the literature include the cost of membership to health clubs, lack of convenient access to exercise facilities, fear for personal safety to walk or play outdoors in certain neighborhoods, with fewer opportunities to form mutually-encouraging friendships that reinforce the exercise habit (Candib, 2007; Cutts, Darby, Boone & Brewis, 2009; Ries, Voorhees, Gittelsohn, Roche, & Astone, 2008).

To align with objectives of Healthy People 2020 (HP2020), inner-city sedentary adults at risk for chronic diseases associated with inactivity need reinforcement from their healthcare providers to understand and act on this knowledge. Trusted health advisors are well situated to encourage their clients to take the next steps to engage in PA and other health-promoting programs that Y community sites offer. Collaboration between a primary care practice and a community wellness partner to support lifestyle change was a strategic component of this project.

The Global Scope and Effects of Sedentary Lifestyles

A starting point for understanding the growing concern for the current and future consequences of not achieving a high population-level engagement in PA can be found in the recent publication of national PA guidelines by health authorities in various countries. On a global level, the World Health Organization (WHO, 2010) developed a set of international recommendations that advise member states about optimal PA levels across several age categories. The WHO recommends that PA augmentation strategies should be put in place wherever daily life is not adequately physically demanding.

In their examination of the role of PA in health, the WHO and the U.S. Department of Health and Human Services Healthy People 2020 (USDHHS-HP2020) believe there is solid evidence that improved PA levels reduce the risk of coronary artery disease, stroke, hypertension, diabetes, cancers of the breast and colon, osteoporosis, certain bone fractures, and depression (USDHHS-HP2020, 2013; WHO, 2010). PA is also noted to be a determinant of weight control and attendant interrelated health complications associated with overweight and obesity such as diabetes and cardiovascular disease. The known health consequences of inactivity are now so well established that the WHO ranks low PA levels as the *fourth leading cause* of global mortality, accounting for an estimated 6% of deaths worldwide (WHO, 2010). Global mortality rankings place inactivity just below hypertension (13%), tobacco-use (9%), and high blood glucose (6%), and just above the related problem of overweight and obesity (5%) (WHO, 2010).

The US has seen a steady increase in obesity rates from about 12% in 1990 to about 28% in 2013 (United Health Foundation [UHF], 2014). Michigan is among the top

ten US states with the highest rates of obesity (UHF, 2014). Obesity is linked to low PA levels in a state campaign to reduce this public health threat (Michigan Department of Community Health, 2013).

Major causes of early mortality such as heart disease, stroke, and several cancers may be directly reduced through increased population PA levels (USDHHS, 2008b p. 10; USDHHS_HP2020, 2013). There is even some evidence, for example, that smoking cessation efforts may be enhanced by PA (Ussher, Taylor, & Faulkner, 2012). In their review of the impact of PA interventions as an adjunct to smoking cessation, Ussher, Taylor, and Faulkner (2012) found one study that reported a more than doubled likelihood of non-relapse at 12 months when PA is a part of the intervention.

A growing body of evidence indicates that the range of conditions that are helped by PA is quite broad and includes amelioration or prevention of the major causes of morbidity and mortality in the U.S. and world-wide (USDHHS-Assistant Secretary for Planning and Evaluation, 2002). To help in efforts to quantify beneficial amounts of PA, a number of guidelines for adults have been written by expert bodies and will be discussed next.

Exercise Guidelines Target Insufficiently Active Adults

The WHO (2010) recommendations define the frequency, duration, intensity, amount, and type of PA thought necessary for the prevention of non-communicable diseases. Due to age-based differences, the WHO devised three sets of recommendations specific for people 5 to 17, 18 to 64, and greater than or equal to 65 years of age. The 18 to 64 year-old grouping comprises the target audience for this project.

The summary of WHO (2010) recommendations with *dose-response* patterns taken into consideration for adults age 18 to 64 years are (a) at least 150 minutes of moderate-intensity aerobic activity per week, or 75 minutes of vigorous-intensity, or a combination of moderate- and vigorous-intensity that is roughly equivalent to either individual intensity goal; (b) sessions of aerobic activity should last at least 10 minutes; (c) for additional benefit the times listed in the first recommendation may be doubled to 300 and 150 minutes consecutively, or an equivalent combination; and (d) muscle strengthening activity involving major muscle groups should also be done on two or more days per week. Muscle strengthening exercise sessions should be separated by at least one day because they place higher levels of stress on muscle tissue. These recommendations may be applied irrespective of race, gender, ethnicity or economic level but may need to be adjusted based on certain medical conditions, disability, pregnancy, and postpartum states. The order of priority for an inactive person to attain the recommended PA levels is to first increase *duration* and *frequency* of an activity such as walking, then *intensity* (USDHHS, 2008b p. 8, 24; WHO, 2010, p. 24).

More than a decade ago, the U.S. Department of Health and Human Services - Healthy People 2010 objectives detailed the need for population-level PA increases in order to improve the nation's health (USDHHS-HP2010, 2000). None of the targets were reached but statistics showed movement toward the goals. In a few instances, there was regression from previous levels (Centers for Disease Control [CDC], 2013b). In the intervening years, the evidence for the health benefits of PA were refined and reinforced. The PA emphasis has become so foundational to the nation's health that PA augmentation continues to be a vital national goal (USDHHS - Healthy People 2020 [HP 2020], 2013).

The updated HP2020 objectives were based on recommendations from the USDHHS (2008b) PA guidelines (see Table 1). The USDHHS standards also informed the WHO's (2010) PA recommendations, which were adapted by the organization for a worldwide audience. The Department of Health (DOH, 2011) of the United Kingdom (UK) also published PA guidelines that, with a couple of small exceptions, essentially mirrored those of the WHO and the USDHHS. The DOH advice for adults starts at age 19 years rather than age 18 years, and adds a recommendation that adults should minimize sitting or being sedentary for extended amounts of time.

For dissemination in the U.S., HP2020 (USDHHS - HP2020, 2013) objectives PA-2.1 through 2.4 reflect the USDHHS (2008), WHO (2010), and the UK DOH's (2011) recommendations for the adult age group. Before addressing recommended benchmarks of adult PA, HP2020 objective PA-1 launches an initial move toward becoming active and seeks to reduce the proportion of U.S. adults who are not engaged in *any* leisure-time PA. Leisure-time PA is activity that one engages in that is generally for recreation and not related to occupation.

This project addressed HP2020 objective PA-1 by helping people begin to engage in at least a small amount of leisure-time PA. PA-2 series recommendations are expected to be attained with long-term adherence to the practice enhancements enacted through this project as clients are continually reminded of their PA deficits. Finally, the HP2020 PA-11 objective series that aim to increase the proportion of PC office visits that include PA education or counsel were directly addressed by this project. Unfortunately, the wording of PA-11 objectives is not up to date with all the types of providers who contribute to PC because the terminology, "*physician* office visits" [emphasis added] was

used. The remainder of the HP2020 PA objectives either address children and adolescents, or system-based changes that were outside the scope of this project.

Table 1

HP 2020 Physical Activity Objectives that this Project Addresses

<u>Objective</u>	
PA-1	Reduce the proportion of adults who engage in no leisure-time physical activity
PA-2	Increase the proportion of adults who meet current Federal physical activity guidelines for aerobic physical activity and for muscle-strengthening activity
PA-2.1	Increase the proportion of adults who engage in aerobic physical activity of at least moderate intensity for at least 150 minutes/week, or 75 minutes/week of vigorous intensity, or an equivalent combination
PA-2.2	Increase the proportion of adults who engage in aerobic physical activity of at least moderate intensity for more than 300 minutes/week, or more than 150 minutes/week of vigorous intensity, or an equivalent combination
PA-2.3	Increase the proportion of adults who perform muscle-strengthening activities on 2 or more days of the week
PA-2.4	Increase the proportion of adults who meet the objectives for aerobic physical activity and for muscle-strengthening activity
PA-11	Increase the proportion of physician office visits that include counseling or education related to physical activity
PA-11.1	Increase the proportion of office visits made by patients with a diagnosis of cardiovascular disease, diabetes, or hyperlipidemia that include counseling or education related to exercise
PA-11.2	Increase the proportion of physician visits made by all child and adult patients that include counseling about exercise

Note. Adapted from "Healthy People 2020 Topics & Objectives: Physical Activity" by Healthy People.gov, Retrieved from <http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=33>

Garber et al. (2011) in the position statement for the American College of Sports Medicine (ACSM) recommended the quality and quantity of exercise necessary to maintain cardiorespiratory, musculoskeletal, and neuromotor fitness in healthy adults. The ACSM's focus on the necessary "pattern and volume" (p. 1335) of exercise for health benefits was roughly equivalent to the *dose-response* notion for the determinations of PA levels by the WHO (2010). The ACSM recommendations were intended to act as

guidance for individualized *exercise* prescription while they acknowledge that the majority of the studies from which they were derived were based on *PA* evaluations. The two concepts are used interchangeably because *PA* encompasses exercise while being more inclusive of types of activity that may not meet the narrower definition of exercise. Among the ACSM declarations, one rated highest by evidence category states that "Engaging in regular exercise and reducing sedentary behavior is vital for the health of adults" (Garber et al., 2011, Table 1, p. 1335). The ACSM position further stipulated over and above the time and intensity recommendations of the WHO (2010): (a) ≥ 5 days/week of *exercise training* for ≥ 30 min/day; (b) add in ≥ 20 min/day of vigorous-intensity cardiorespiratory exercise training ≥ 3 days/week; and (c) neuromotor and flexibility exercises to maintain and enhance balance, agility, coordination, and joint range of motion (Garber et al., 2011).

Clearly, inadequate *PA* levels are a worldwide concern reflecting fairly universal needs as there are strong similarities among these various sets of guidelines. General knowledge that *PA* recommendations exist may not provide individual clients with motivation for action unless they understand why there is such concern among global, national, and state health authorities. The next section provides an overview of the impact that *PA* has on global population and individual health that drive this concern.

Effectiveness of *PA* for Reducing Risk of Various Diseases

Current knowledge about the relationship between *PA* and common causes of morbidity and mortality in the U.S. should provide motivation to place greater emphasis on improving *PA* levels (Janiszewski & Ross, 2009; Pugh, 2012; Wallace, 2002). Chronic conditions such as diabetes mellitus, osteoporosis, stroke and cardiovascular

disease are major health conditions for which the incidence can be reduced or delayed through increased PA, particularly when starting at a young age and from a sedentary baseline (Health Scotland, 2008). The Royal College of Physicians (2012) concluded that there is evidence that of all coronary artery disease deaths, 37% were attributable to physical inactivity, compared to 19% from smoking and 13% related to hypertension. A key objective of healthcare providers is to find techniques to boost intensity of PA of any kind and sustain those behaviors throughout adulthood.

Prevention or delay of many chronic illnesses (that are a frequent cause of acute illness events) needs to begin while there is still an opportunity to provide the greatest benefit over the lifespan. The earlier in life that people adopt an active lifestyle, the better their health outcomes will be. For example, PA that becomes a part of the lifestyles of young adult women would make a difference in the lives of many who would likely suffer from osteoporosis later on (Bloomfield, 2005). PA that is protective against cardiovascular disease show an effect when engaged in over many years (Sofi, Capalbo, Cesari, Abbate, & Gensini, 2008). A PA regime that includes exercise, if started at a younger age so that intervention is part of a *lifespan approach* (USDHHS, 2008b), could delay or prevent diabetes and neuropathy by averting insulin resistance and blood glucose elevations (Garber et al., 2011; Health Scotland, 2008).

Contributions of the Social and Built Environment and Fees

A possible barrier to PA involvement for residents of inner cities is the nature of the environment. Cutts, Darby, Boone and Brewis (2009) expected to find a correlation between the quality of the built environment and activity levels. In contrast to their expected findings, they found the built environment of the U.S. urban area that they

examined did provide access to parks and walkable streets. The authors suggest that the built environment is not a significant cause of low PA and point to social characteristics, for example higher crime rates in these neighborhoods, as more determinative of low PA participation (Christian et al., 2011; Cutts et al., 2009). Higher crime is, unfortunately, a characteristic shared by the Heartside, Southwest area, and other neighborhoods of central Grand Rapids, Michigan (Community Research Institute, 2013) where this project was located.

Silva, Cashman, Kunte, and Candib (2012) took the approach that hosting PA activities in familiar, nearby, safe neighborhood organizations such as the Y and its partnering community-based agencies would overcome a number of these barriers. Though they found that this approach was successful, when a small monthly fee was instituted (\$10/month), attendance dropped off for women and elders, while it increased for men, particularly younger men. For the sake of this project, attention was given to the organizational and environmental resources that currently exist. Improved access to safe indoor facilities is a short term solution to issues of the built environment and social conditions until such time as health policy and societal changes can make an impact.

Current Status of Primary Care Promotion of PA

The current state of PC practice does not adequately make use of known PA-boosting tools. Implementation of standardized effective interventions could, in the long term, reverse broad-based PC provider beliefs that there is not enough time to counsel clients and that changing PA behavior requires more skill than they already have. Provider inaction also comes from a perception of lack of patient follow-through with change (Grimstvedt et al., 2012; Royal College of Physicians, 2012; Smith, VanderPloeg,

& Buffart, 2008). Grimstevdt et al. (2012) found in their survey of nurse practitioners (NPs) at a regional conference in the Southwest U.S. that 75% of respondents reported *routine* PA counseling engagement.

In their critical review of primary care PA promotion practices, VanDillen, VanBinsbergen, Koelen and Hiddink (2013) found that counsel provided to clients in healthcare settings was often quite general and that advice for combined PA and other behavior change, such as weight loss, was low. Shay, Shobert, Seibert, and Thomas (2009) found in their review of eight studies that PC providers *do not* often address weight control strategies (which include increasing PA) and cite among the reasons given: time constraints, insufficient training, lack of remuneration, and a belief that clients will not be successful. Reviews by Hebert, Caughy, and Shuval (2012) and Lobelo, Duperly, and Frank (2009) uncovered similar issues in their appraisals of provider perceptions of the drawbacks of PA counseling. Providers were also uncertain about the effectiveness of counseling and were less likely to advise adoption of PA if they are inactive themselves, or if they did not believe their client's health problems would benefit from PA behavioral change (Fie, Norman & While, 2011). It was suggested by Burns et al. (2000) that encouraging PA among sedentary PC providers might increase the likelihood that they would give more effective attention to PA in their clients.

Buchholz, Purath and Rittenmeyer (2009) in a study of perceptions of nurse practitioners in outpatient settings (family, women's health, and adult) found that even when NPs counseled clients about PA, they did minimal assessment to determine habitual or baseline PA levels. A national survey by Burns, Camaione, and Chatterton (2000) that

targeted adult NPs efforts to augment client PA levels achieved a response rate of 60% with 606 total respondents from 43 states. Eighty-four percent of their sample said they relied on anthropometric measures to indicate PA levels, 24% said they test physical performance, and 18% used calculations of body fat composition. While 99% of NP respondents said they discuss PA with clients, only 67% provided written information to supplement counsel, and only 43% used referral to an exercise professional. The top five barriers to PA assessment and intervention cited by the NP-respondents included lack of time (~63%); a belief that other concerns were more important (~58%); a sense of ineffectiveness related to an expectation of poor client follow-through (~21%); unsafe neighborhoods that limit outdoor activity (~20%); and language barriers (~17%).

Farran, Ellis, and Barron (2013) found that adherence to obesity treatment guidelines was enhanced by exposing providers to education on guidelines. PA counseling was measured and documented in only about 5% of encounters prior to the provider education intervention. Documentation of PA counseling increased to about 17% of encounters in the 3 months after the education. While we might applaud the significant improvement, we should also ponder that less than one-fifth of clients who have a health problem that could be helped by exercise, received PA advice *soon after* a provider-targeted compliance intervention.

In contrast to defeated attitudes and uncertainty about the outcome, healthcare providers should realize that according to the Royal College of Physicians (RCP), "Primary care has the greatest opportunity of all areas... to raise the general levels of physical activity participation... and also to guide patients along the right exercise treatment pathway" (RCP, 2012, p. 4). If PC providers simply perform an advice-giving

function, it will likely provide a boost in activity for many people. About 25% of people who were asked if they would become more active if advised to do so by either a doctor or nurse said they would (RCP, 2012). PA intervention studies reviewed in the next chapter will show that a reasonable number of clients may be expected to increase their PA level if advised and supported in doing so by their healthcare providers. Health Scotland adds that "the primary care setting is... uniquely placed to raise public awareness of the key messages around physical activity" (2008, p. 3).

The U.S. Preventive Services Task Force (Lin, O'Connor, Whitlock, & Beil, 2010) found that behavioral counseling for diet and PA for prevention of CVD provided a small health benefit but commented that effectiveness might be increased if promotions are embedded in broader public health initiatives encouraging healthy lifestyle changes. Population-level initiatives have emerged at the state level through the Michigan Health and Wellness 4x4 Plan (Michigan Dept. of Community Health, 2012) and on the national scene in the U.S. through the *Let's Move!* initiative to combat obesity, which has PA intensification as one of its principle aims (LetsMove.gov, n.d.). It is also important to note that in a PC setting, healthcare providers are likely to bundle counsel and information concerning weight loss and dietary changes along with the PA discussions. It is not expected that the PA intervention should be uncoupled from these naturally comprehensive, and often necessary recommendations; however, for the sake of this project, PA intervention was considered the primary focus.

Clinical Staff Survey of Usual PA Practice

Preliminary discussions with NPs and registered nurses (RNs) revealed that practice at the FHC confronted the same barriers mentioned by the above authors. They

thought that time constraints were a prominent limiting factor. There was no standardized approach to PA counsel among FHC practitioners, and inconsistency in using literature and community referral. A clinical staff (RN and NP) survey (see Appendix H) was conducted to assess usual practice for treating insufficient PA as a health problem worthy of intervention with their clients before instituting changes through the project to improve PA assessment, intervention and documentation.

The professional qualifications of those completing the survey were two RNs who roomed and discharged most clients, two pediatric NPs who saw older adolescents, and two NPs who saw adults, for a total of six respondents. These six comprised the entire clinical staff at the time the survey was completed. Of the six, one indicated no significant engagement in PA discussion with clients. The remaining five participants estimated their PA intervention engagement at between 50 to 80% of visits at an average of 66%, or two-thirds of visits. The average for NPs-only was 70%, with all four reporting discussing PA during at least 50% of visits.

Three of six FHC respondents thought that a theoretically-based PA counseling review would be helpful to them. Three of six also reported sometimes referring clients to community PA resources. Two respondents thought that other barriers to referral were cost and transportation. Only two of five FHC staff members who engage in discussion of PA reported providing written literature or web-based information to clients who were counseled. Three of five reported that they regularly documented their PA interactions in the electronic health record (EHR). The EHR in use at the time of the survey did not require goal-setting or remind providers of goals set at previous visits. Based on usual practice, if PA was to be viewed as a foundation for healthy living by FHC staff, then

improved engagement in assessment, counsel, use of literature, referral, and documentation for reimbursement was needed.

Summary of the Project Focus

A change in PA assessment and intervention practice quality has as a long-term goal, to delay or prevent a broad array of diseases and conditions that affect quality of life (USDHHS- ASPE, 2002). Current literature which establishes the association of insufficient PA with poor health outcomes is reviewed in Chapter 2. PA assessment is thought to be a necessary part of the periodic health evaluation performed by the PC provider (Royal College of Physicians, 2012). Through regular contact with at-risk adult populations, providers in PC should be among the first to regularly assess clients for insufficient PA levels (Royal College of Physicians, 2012). Application to clinical practice requires that a standardized means of assessing PA is in place and in regular use so that it provides a cue to action on the part of the healthcare team. When an adult is found to be insufficiently active, action by PC staff can make a difference in long-term health outcomes. Among the primary goals for this project was initiation of a standardized PA assessment that sets the parameters for intervention.

Inactivity is considered a leading contributor to premature death for which there is an available array of evidence-based interventions which are reviewed in Chapter 2. The global extent of the problem of adult sedentary lifestyles points to the need for urgent application of proven PA interventions that are compatible with the time constraints of PC.

The clinical *problem* for this project is how to assist FHC personnel in providing the necessary PA assessment and intervention for their clients on a consistent basis. The

clinical *questions* are then, what are the best tools for PA assessment, intervention, and documentation; and, how to integrate them into practice at the FHC? Documentation needs to be done in a manner that will contribute to the determination of payment for services.

Through the interventions of counsel, delivery of educational literature, referral and follow-up, staff members can draw insufficiently active adults into personal investment in their own health. The efforts of the PC team can be augmented through a referral partnership with neighborhood Y community sites that offer professionally-led, popular, group exercise, at little or no cost to the referred participant. Putting this partnership with the Y in place was another goal of this project. As barriers are reduced, client engagement with PA should increase. Another purpose of this project was to provide the FHC with a written policy for PA assessment, intervention, and documentation that codifies and guides performance flow and integration with care components of a client visit.

To organize project elements, a logic model framework for implementation was developed (see Chapter 3). Theoretical support that was expected to drive PA interventions toward effectiveness was identified. A project plan and timeline were developed (see Chapter 4) using the constructs of the model to organize the project elements and present the outcomes used to evaluate the effectiveness of the implementation strategies that were employed.

CHAPTER 2

LITERATURE REVIEW

Current Knowledge of the Associations Between Disease and PA

This chapter will present evidence of a strong correlation between PA levels and a variety of chronic diseases. Since this evidence is strong enough to motivate national and international recommendations for action, evidence for the best and most practical interventions to improve PA among PC clients are discussed. The evidence that is gathered on interventions is summarized and applied to the project goals in later chapters.

O'Donovan et al. (2010) released a consensus statement on behalf of the British Association of Sport and Exercise Science that was designed to provide guidelines for health professionals who might recommend PA to clients. Their literature review indicated that there is substantial high-level epidemiological evidence that PA is associated with reduced risk of coronary artery disease (CAD), colon cancer, obesity, diabetes type 2 and other chronic conditions. The consensus statement includes specific recommendations for beginner exercisers who are starting from a sedentary baseline level of activity. Gretebeck, Ferraro, Black, Holland, and Gretebeck (2012) found in a study of 6913 adults that long-term recreational PA engagement reduced the risk of becoming disabled from *any cause* at 10 and 20 years from baseline. Though many benefits of exercise are realized by adults of any age, the strongest preventive features may have their greatest influence as they do for bone strength for example, when started in the earlier stages of development, at a time when PA may develop into a lifelong habit (Bloomfield, 2005; Callreus, McGuigan, Ringsberg & Akesson, 2012; Kohrt et al., 2004; Martyn-St James & Carroll, 2010). In this chapter, the foundational importance of PA as

a health promoting activity is shown through evidence of its contribution to a reduction of morbidity and mortality for a number of chronic conditions.

Cardiovascular Disease, Diabetes, Overweight and Obesity

Ongoing regular PA that is accompanied by weight loss, diminished visceral fat, and overall increased fitness promises the greatest total benefit by reducing cardiometabolic risk (CMR) whether or not there is preexisting disease (Garber et al., 2011; Janiszewski & Ross, 2009; Okay, Jackson, Marcinkiewicz & Papino, 2009). It is also worth noting from these studies that even without weight loss or diminished visceral fat, regular exercise still decreased CMR. Specific improvements related to cardiovascular effects are improved high density lipoprotein-C and overall cholesterol profile, lowered blood pressure (if elevated), and lowered risk of stroke (Garber et al., 2011).

Jakicic (2009) reported on the status of the scientific evidence for the relationship of PA as a lone intervention for weight loss and found that it is actually quite modest at < 3% of initial body weight. Importantly, however, the weight lost is abdominal adiposity which has implications more significant than the total amount because it may reflect an accompanying lowered CMR. If combined with a dietary intervention, the contribution to weight loss may be additive compared to PA as a lone intervention (Jakicic, 2009).

Beyond more immediate results, PA plays a stronger role in long-term weight loss and maintenance. The results of a systematic intervention review by Shaw, Gennat, O'Rourke and Del Mar (2006) pooled effects from fourteen trials with 1049 participants to find an additional 1.1 kg weight loss (95% CI 0.6 to 1.5) when a PA intervention is combined with diet compared to diet alone, with a follow-up interval that varied from 3

to 12 months. In four trials involving pooled results of 317 participants, high intensity exercise showed a greater weight reduction of 1.5 kg (95% CI 0.7 to 2.3) compared with low intensity exercise (Shaw et al., 2006).

Depression and Mental Health, Dysmenorrhea and Fibromyalgia

Anshel (2006) describes the numerous mental health benefits attributed to exercise. Personality is generally not directly affected by exercise with the exception of the self-concept and certain dimensions of self-esteem, particularly those tied to the physique. The psychological concept of *hardiness* is associated with higher levels of habitual exercise and moderation of the negative effects of stress on both physical and mental health. Because hardiness is thought to be trait-like, Anshel (2006) suggests that PA would not likely improve hardiness. Cognitive and affective disorders respond positively to exercise while personality is relatively unaffected. For example, both acute and chronic anxiety are reduced by aerobic exercise, but only *state anxiety* is reduced, not *trait anxiety*. The latter is tied to a personality disposition as opposed to a situational perception. Stress reduction occurs with regular participation in PA and is more likely to occur if the exercise session lasts 30 minutes or more.

Depression prevention and treatment have both been found amenable to exercise therapy (Anshel, 2006). In his review, Anshel found that a person's baseline PA is negatively associated with depression symptoms 25 years later. Sedentary adults are over three times more likely to suffer from depression than those who regularly partake in PA. PA as treatment for depression is effective for all age groups and both genders and is not dependent on the type of PA. Effectiveness is somewhat dependent on *duration* because

it improves when engaged in for at least 5 weeks. Greater PA *intensity* was also associated with a greater reduction in symptoms.

Daley (2008) synthesized English-language reviews of the evidence for the effects of exercise on depression, and meta-analyses found exercise therapy is better than no treatment and is as effective as pharmacologic and other interventions for depression, including showing promise in the post-natal type. Because there were concerns with methodological quality and unknowns about long-term benefits, Daley concluded that PA should be considered an add-on intervention until high quality trial evidence is found.

Brown and Brown (2010) systematically reviewed studies exploring the effect of PA on reduction of dysmenorrhea symptoms. As of August 2009 only four trials were identified that fit the research question, and only one met inclusion criteria. The included trial used the Moos Menstrual Distress Questionnaire, and symptoms that were measured by this instrument were continuously reduced over three observed cycles. More robust research will need to confirm this potential benefit of PA. Premenstrual syndrome (PMS) includes a group of psychological and somatic complaints that occur regularly during the luteal portion of the menstrual cycle and that resolve around the time of menstruation.

Daley (2009) reviewed available studies on the role of exercise interventions for reduction of PMS symptoms and found only four that met eligibility criteria. While all four reported a reduction in PMS symptoms, they suffered universally from poor methodological quality and small sample size. No firm evidence-based recommendation can therefore be made regarding the role of PA in reduction of dysmenorrhea.

In a review of the potential for PA to improve well-being, physical function, and reduce symptoms in fibromyalgia patients, Busch, Barber, Overend, Peloso, and

Schachter (2007) found that across 34 studies involving 2276 participants, aerobic-only exercise was associated with improvements in global well-being measures. Stahl (2008), who is considered a leading expert on neuropharmacology, places exercise as a second-line treatment for resolution of fibromyalgia pain. Stahl notes that the science of brain physiology supports that exercise, among other interventions, appears to promote the secretion of growth factors that cause helpful proliferation of neurons in key areas of the brain such as the hippocampus. Growth factors are known to help keep neurons alive and functioning when they are ailing due to stress, depression and aging. This mechanism may provide an explanation for PA benefits for psychological and neurobiological diseases.

Musculoskeletal Health

Although genetic make-up plays a significant role in determining bone mass, lifestyle accounts for a considerable proportion of the non-inheritable variation in individual bone mineral density [BMD]; (Bloomfield, 2005; Borer, 2005; Brecher et al., 2002; Greendale et al., 1995; National Osteoporosis Foundation [NOF], 2011). BMD is an important determinant of osteoporosis risk. Among the proposed preventive and treatment measures for osteoporosis are increased nutritional intake of calcium and vitamin D (or increased exposure to sunlight), and various forms of exercise (Brecher et al., 2002; Ernst, 1998; NOF, 2013; Osteoporosis Australia, 2014; Welch & Weaver, 2005). Exercise in combination with adequate calcium intake and hormone replacement therapy for postmenopausal women is associated with increases in BMD (Going et al., 2003; NOF, 2013). PA has been shown to be an important lifestyle choice that is capable

of halting or at least slowing age-related thinning of bone (Ernst, 1998; International Osteoporosis Foundation [IOF], 2012; NOF, 2013).

Increased general fitness obtained through PA is known to reduce the risk of hip and other fractures related to osteoporosis (IOF, 2012; NOF, 2013). Benefits that PA are believed to provide vary from increases in BMD (Borschmann, 2012; Ernst, 1998; Guadalupe-Grau, Fuentes, Guerra, & Calbet, 2009; Howe, et al., 2011; Martyn-St James, & Carroll, 2006; Pearson, Burkhart, Pifalo, Pilaggo-Toy, & Krohn, 2005) to reduction in fall risk, (Borschmann, 2012; Garber et al., 2011; Gregg, Pereira, & Caspersen, 2000; NOF, 2013; Pearson et al., 2005; Province et al., 1995) to slowing of progressive bone loss (Garber et al. (2011). Degradation of bone micro-architecture results in structural weakening that, once lost, may not be recoverable with the use of bisphosphonates and other drug therapies (Borschmann, 2012; Felsenberg & Boonen, 2005; Vilela & Nunes, 2011).

Regular exercise that *begins in youth* has been shown to slow progression toward osteoporosis in later years (Borer, 2005; Cooper et al., 1995; Ernst, 1998; Greendale, Barrett-Connor, Edelstein, Ingles, & Haile, 1995; Morseth, Emaus, Wilsgaard, Jacobsen, & Jorgensen, 2010). Although there has been some doubt about the contribution of non-loading (low-impact) exercise to improving BMD, there is consensus that maximum benefit to BMD is attained when individuals regularly engage in high impact exercise continuously from *early in the lifespan* (Bloomfield, 2005; Callreus, McGuigan, Ringsberg & Akesson, 2012; Kohrt et al., 2004; Martyn-St James & Carroll, 2010). Organized team sports participation that begins in adolescence or early adulthood and continues as a lifestyle, predicts bone strength measures such as higher calcaneal stiffness

(Welch & Rosen, 2005) and higher upper extremity BMD (Kannus et al., 1995). These increases may delay or even prevent the development of osteoporosis later in life (Borer, 2005; Morseth, et al., 2010; USDHHS, 2008b). Based on the evidence of lifespan bone density studies, providers need to give attention to building PA habits as early as possible in adulthood if they have not been established earlier. The USDHHS (2008a) PA guidelines specifically address musculoskeletal health of premenopausal adult women and conclude that the preponderance of evidence supports exercise training as a benefit that is clinically important for osteoporosis risk reduction, especially when the program targets relevant skeletal regions with weight-bearing and resistance types of PA.

Cancer

Maitre (2009) found that *moderate* PA performed for 3 hours or more per week, no matter the type of activity, reduces risk of breast cancer by 22%. In a dose-response manner, reduction in risk increases to 26% for *vigorous* intensity PA. To gain the benefit, the individual needed to engage in PA regularly throughout their lifetime. Maruti, Willett, Feskanich, Rosner, and Coditz (2008) similarly found a reduction in premenopausal invasive breast cancer risk that was also dose-responsive, with higher amounts of PA resulting in greater risk reduction. The strongest association correlated with lifetime total leisure-time PA more than with a particular intensity of PA or age period. The relative risk was 0.77, or 23% lower (95 % CI 0.64 to 0.93) for women engaged in 39 MET-hr/week or more, compared to women whose activity levels were lower. This activity level translates to 3.25 hr/week of running or 13 hr/week of walking.

Health Scotland (2008) reports an overall risk reduction for cancer associated with PA. When comparing individuals in the most active groups to those who are least

active, there is a 40% to 50% reduction in colon cancer risk. Women had a 30% lower risk of developing breast cancer. In their systematic review of controlled clinical trials, Winzer, Whiteman, Reeves and Paratz (2011), examined the effect of PA on cancer biomarkers. Intervention duration lasted for a minimum of four weeks among both cancer survivors (to determine tertiary prevention), and people with one or more risk factors for cancer who never had the disease. There were four studies included in the primary prevention arm and five in the tertiary prevention group. For markers implicated in the risk for developing breast and colon cancer, such as insulin, leptin, estrogens, and regulators of apoptosis, there was a small to moderate improvement in serum levels. There were similar small to moderate improvements in some biomarkers useful for prognosis of breast cancer among survivors, including insulin, insulin-like growth factor axis proteins, and inflammatory markers, while immune function was enhanced markedly. Finally, Cramp and Byron-Daniel (2012) updated their intervention review of the earlier 28 studies with an additional 28 cancer-related fatigue studies pre- and post-cancer treatment. The study data included 1461 persons who received an exercise intervention compared to 1187 controls. A meta-analysis that incorporated 38 comparisons, found that exercise reduced cancer-related fatigue in adults statistically more than the control intervention (SMD -0.27, 95% CI -0.37 to -0.17).

Overall, current trends in evidence found that PA has a broad positive impact on health and well-being. The reduction of some diseases such as cancer is surprising, while the effect on other areas, such as musculoskeletal, cardiovascular, and emotional health fit expectations based on anecdotal reports of those who regularly engage in PA. The array of authorities backing PA augmentation as a public health concern lend urgency to

the need for action in light of current high levels of inactivity with attendant morbidity and mortality across these domains (Bull & Milton, 2011; Health Scotland, 2008; Royal College of Physicians, 2012; USDHSS, 2008b)

Interventions to Promote PA Applicable to PC Settings

This section reviews the evidence-base for interventions to boost PA that have been investigated for use in PC settings. The intention was to determine from the literature which interventions to recommend to insufficiently active adults, 18 to 64 years of age, that will likely lead to an increase in their habitual PA. A number of interventions emerged from a search that emphasized effective and practical application in PC. Attributes that are favorable include whether interventions are simple to understand, complementary, rapid, and economical to implement.

Use of a combination of interventions such as printed educational materials given to clients at the time of an office-visit, counsel while in the office, and follow-up phone calls to check on progress and provide further guidance are familiar PC activities. Printed hand-outs are a part of common patient education practice, so the in-office process may entail assuring that a quality PA promotional item is consistently included in the materials discussed with, and given to the patient when indicated by the PA assessment. Offer of a local outlet to engage in PA that removes barriers of cost and location can effectively combine with other facilitation mechanisms such as activity-related affect (i.e., having fun) and participating with supportive friends and family. Professional trainers leading groups in popular styles of exercise regimes are also likely to provide an incentive for engagement. Garrett et al. (2011) found that the majority of PA improvement interventions offered in PC and the community were cost-effective in

quality-adjusted life-years (QALY), when supervision and lengthy instruction are not required. Brief exercise advice and involvement in exercise groups in the community were examples of low cost per QALY interventions.

Baseline PA levels need to be assessed in order to evaluate the outcome of PA interventions. The Royal College of Physicians (2012) urges that PC providers view screening for PA status as every bit as important as screening for tobacco use. Patrick, Pratt, and Sallis (2009) proposed that PA assessment should be treated as a *vital sign* and checked at *every* office visit starting at age 6 years. A practical measure of PA that is suitable to the time constraints of PC is discussed in Chapter 4. Once PA status is determined to be in need of improvement, the office staff then could apply a ready toolkit of approaches to promote PA as a habitual part of the client's lifestyle. The aim of this section is to identify the tools that are practical and appropriate for real-world PC. Intervention methods suited to PC should have evidence which shows they are effective for encouraging PA adoption, ideally, both in the short and longer term, so that PA can become a life-long habit.

PA Counsel or Advice

The classic mode of intervention aimed at lifestyle change in PC is provider-patient conversation that moves from the findings of a PA assessment toward advising lifestyle change based on health promotional guidelines. Where time and resources are available, certain interventions may complement therapeutic advising and provide an additive effect on the outcome of increased PA. In many studies, multiple interventions besides the one targeted for measurement, were used simultaneously or in rapid sequence by the intervention group (IG). These add-ons were often mentioned but not accounted

for, which blurred the ability to attribute effects uniquely to the counseling. Often, it is difficult to determine the precise contribution of an individual intervention over the baseline of what PC staff were doing before the research took place because usual care is not described in the methods section.

Counseling clients for PA improvement has a 20-year history of evidence for effectiveness. Calfas et al., (1996) found evidence for increased PA engagement when counsel is provided conscientiously in a single session for as briefly as 3 to 5 minutes with the goal of motivating and supporting sedentary clients based on their *stage of change*. In their illustrative quasi-experimental controlled trial, Calfas et al. targeted participants who were adults, 18 years and older, and racially diverse. Their sample participants were 84% female and 28% ethnic minority at a mean age of 39 years, recruited from PC settings if they had a well visit or chronic disease follow-up appointment due within 6 weeks. Eligible clients from the 17 physician offices were sent a recruitment letter and called for screening and excluded if not found to be sedentary, deemed unable to do *moderate* PA, or were non-English speaking. Providers in the IG underwent training in a counseling technique that was based on the transtheoretical model (TTM), also known as the stages of change (SOC) model, while control group (CG) providers underwent training on how to provide care for Hepatitis B. IG clients were called by a bachelor's level health educator blinded to previous activity level and given a 10-min *booster* session matched to patient needs. Some participants were sent *tip sheets* by mail after the phone call, which appear to have contained further PA advice. The purpose of calls was to answer questions and discuss participants' PA progress.

Beyond the provider counseling, it is clear from the methods description that there were several interventions applied, including telephone follow up for all those in the IG, and educational literature sent to some participants. The pre- and post-measurement tools used were the Seven-day Physical Activity Recall (7DPAR); an assessment from the physician-based assessment and counseling for exercise (PACE) tool; and several self-report walking measures (total walking, walking for exercise). These were administered by telephone interview using only time in moderate activity as the outcome variable. To check the accuracy of the self-report measures, a subgroup of both IG and CG participants wore accelerometers for 2 weekdays plus 1 weekend day.

Both the IG and CG were at the same SOC at baseline; however, the IG members who received the PACE intervention were more likely to become physically active. Five of six dependent measures showed a significant increase in PA which included and aligned with the accelerometer results. Scores on PACE, $Z = 5.63, p < .005$, NHIS walking for exercise, $Z = 1.74, p < .05$, Paffenbarger total walking score, $Z = 2.25, p < .025$, Paffenbarger walking for exercise, $Z = 1.79, p < .05$, and accelerometer, $Z = 2.58, p < .005$, all showed significant improvement. The 7DPAR result was in the direction of positive change, but failed to reach significance by a small amount, $Z = 1.47, p < .08$. Interviews were conducted with the ten IG providers consisting of PC providers from a variety of specialties and settings. Qualitative results from the interviews found that providers thought the PACE method of counseling was practical for application in their PC settings. Several limitations of this study include the short follow-up period of 4 to 6 weeks and that *pre-contemplative* and *active* stage clients were not evaluated. Therefore, promotion and maintenance of PA in these groups were not studied. The authors

acknowledged that adding the phone call (and the educational documents, too) blurs the effect of counseling as a sole intervention.

Harland et al. (1999) used multiple interventions that are so often woven into PA studies purposely in the IG but inadvertently in the CG. The study population was recruited from a PC practice in an area described as socioeconomically disadvantaged and achieved a completion rate of 85% at one year. The researchers used an initial assessment and brief advice that included personalized testing and discussion of PA. Subjects were also provided take-home literature that discussed the benefits of PA and other lifestyle issues (diet, alcohol consumption, smoking, body weight) for all four IGs, plus the CG. The IGs then were offered further interviews based on motivational interviewing (MI), the first of which took place 2 weeks after the initial assessment. The MI sessions were delivered by *health visitors* who are registered nurses or midwives who receive further training for qualification. The four IGs differed in the number of MI sessions, (two groups receiving one and two groups up to six sessions), and whether they received leisure center vouchers, valid during the study for free access to local exercise facilities. The vouchers, strangely, were considered a *financial incentive* rather than an added motivational, barrier-reduction strategy.

Harland et al. (1999) focused on the vouchers and intensity of interview application, but allowed the use of a mixed set of strategies for those not receiving MI or the vouchers. The CG for example, received a multifaceted intervention that was referred to by researchers as an *assessment*. Compared to baseline, 23% of control clients self-reported increased PA levels during the previous 4 weeks, 12% increased the number of exercise sessions of moderate intensity, and 19% increased the number of vigorous

intensity exercise sessions in which they participated. The IGs had significantly better increases in these measures compared to the CG at 12 weeks, while they had ongoing MI sessions. This difference was not maintained at one year. The CG's PA increased while the IGs decreased from the 12 week high. The PA levels of the IGs, while higher than the CGs, were not statistically different.

The literature illustrates that CGs or comparison groups, when examined carefully for the type of intervention or method of interaction, are often *not* synonymous with *usual care*. CG participants often receive one or more interventions that could boost PA participation, so it is not surprising to see improvement in PA measures. Therefore, a non-significant or weakly significant difference between the IGs and CGs on final comparison obscures the actual improvement in *all* the participants, which may be clinically important. CG members in Harland et al. (1999) improved 23%, 12% and 19% at one year on the three respective measures (increased PA, increased total sessions of vigorous PA, increased total sessions of moderate PA) compared to 26%, 20% and 22% for IGs on the same respective measures.

In Harland et al. (1999), only 41% of the 180 participants who received vouchers used some of them. Those who did only averaged about 3.72 vouchers used (each voucher = a single facility visit), with the group receiving intensive MI redeeming more. The voucher incentive was not a significant factor for improving PA participation between IGs who did or did not receive them. The fact that vouchers were viewed as a financial incentive means that they were not deployed for their other potential barrier-reducing aspects, such as access to expert instruction, and socializing during exercise. This study from the U.K. did not view counseling, educational literature, and a voucher

system offering free access to leisure centers (equivalent in the U.S. to health and aquatic centers) as potentially significant inducements to increase PA, by themselves. This study supplies unintended evidence in favor of brief, personalized PA advice, and free access to facilities, that thereby eliminates barriers to PA participation.

More recently, as more and more studies of PA interventions have accumulated, Carroll et al. (2008a) attempted to review systematically the effectiveness of provider-initiated counseling aimed to assist clients among *underserved* or *vulnerable* populations using the strength of recommendation taxonomy (SORT). The SORT system is used to grade either a body of evidence or an individual study based on outcomes that are patient-oriented in terms of morbidity and mortality (Ebell et al., 2004). The authors were unable to find any study that included both PC counsel and a PA outcome used exclusively with an underserved population. In eight studies (including seven RCTs) that met general inclusion criteria, a variety of PC personnel performed the counseling. Sessions were as brief as one minute on one occasion, or up to greater than 5 min session-length on multiple occasions. Six of eight studies found an increase in PA as measured by a variety of self-report (SR) instruments including PACE, 7DPAR, and PPAQ. Three of the reports included objective PA measures, such as comparison with an accelerometer that the authors describe as *not* showing substantial variance with the SR findings. The authors suggest that PA may be increased at least short-term using counsel that is brief, focused or goal-oriented, integrates with the patient's own needs, is repeated on multiple occasions (future office visit, telephone, or group session), and includes a written plan. They also suggested exploration of collaborative partnerships with community agencies

offering PA programs available to underserved clients upon referral. Community agency referral is precisely one of the interventions employed in the current project.

Information to guide counsel of underserved groups is limited. Carroll et al.'s (2008b) study used the 5-A model of counseling which entails generally sequential steps to Ask, Advise, Agree, Assist, and Arrange to guide intervention in underserved populations. They found that 84% of clinicians *Asked* about PA and 53% gave *Advice*. The *Agree* and *Assist* steps were used by 21% and 26% consecutively, while none of the clinicians included an *Arrange* step. This latter step would be met by devices such as telephone follow-up to schedule a future appointment that checks on progress, or to arrange referral to a community agency. Referral is a way to fulfill the *Assist* step.

Moyer (2012), writing on behalf of the U.S. Preventive Services Task Force (USPSTF), updated earlier recommendations for delivery of behavioral counseling to healthy adults in the PC setting. Even though their overall recommendation was only graded C due to finding just a small net benefit, they acknowledge that persons at higher risk (i.e., sedentary individuals) merit use of behavioral counseling in any case. Grade C recommendations are not thought to merit general application. The recommendation for individual application is based on the knowledge that for those at higher risk because they are sedentary, a small improvement may provide a clinically important CVD risk reduction.

Performing an impressive service to providers interested in the connection of PA to health, Conn, Hafdahl, and Mehr (2011) conducted a comprehensive meta-analysis on outcomes of interventions used to increase PA in healthy adults. An extensive literature search yielded 54,642 English language papers evaluated for inclusion. The research

questions were used to determine the overall effect of interventions designed to increase PA and to determine whether effects vary according to intervention, sample characteristics, or methods. Four standardized mean difference, d effect size categories were calculated from 564 extracted pairwise comparisons. Heterogeneity was expected and managed by using a random effects model, reporting on location and variability parameters, exploring various moderators and interpreting results in a manner that takes heterogeneity into consideration. Total effect sizes were calculated with data from 99,011 participants. IG vs. CG post-intervention comparison involved 74,853 participants (totaling 206 comparisons) and IG pre-post comparisons were calculated with data from 43,701 participants (totaling 498 comparisons).

The median of the mean ages of participants was 44 years. Sample sizes ranged from 5 to 17,579 with a median of 72, and a median of 74% female gender. For those papers that reported ethnicity data, there was a median of 14% minority participation. Intervention types and duration of sessions varied widely. Some interventions were as minimal as a single session of motivational education, to frequent, supervised exercise sessions with a sample mean of 27 sessions.

Results showed a positive overall mean effect, d estimate of 0.19, $p < .001$, 95% CI [0.15, 0.23] for IG vs. CG pre-post comparison as well as IG vs CG post-intervention comparison. A mean effect, d of 0.33, $p < .001$, 95% CI [0.30, 0.35] was found for IG pre-post- comparisons. Thus, on average, IGs overall did increase their PA after completing the interventions, while participation in studies for those in CGs had a mean effect, d size of 0.00, $p = .792$. The positive overall effect size translates to a difference of 14.7 minutes of PA per week, or 496 additional steps per day for IGs. Total minutes

of intervention (which captures total number and length of sessions) and the number of intervention strategies employed were not related to PA outcomes.

The authors expressed some concern for publication bias which they had tried to overcome using a comprehensive search process. Effect sizes were not affected by sample characteristics, the tool used to measure PA, or by degree of control through randomization vs. non-randomization. Participants who were already engaged in regular exercise prior to study enrollment demonstrated a lower effect size, 0.14, $p < .001$, than those who had been sedentary, 0.27, $p < .001$, which is promising for greater positive PA change among those who need it most. Effect sizes were more favorable (larger) in IGs whose attrition rate was smaller than the corresponding CGs. Duration, calculated as the number of days from intervention to outcome measurement, was unrelated to the calculated effect size. This measure also reflects that the number of intervention sessions did not have a significant effect on the PA outcome.

Moderator analyses were to be understood as exploratory, the authors cautioned, with pair analyses labeled *excellent*, *good*, *mixed*, *mediocre*, or *poor*, to give some indication of generalizability and robustness. Robustness of results was considered *excellent* for intervention characteristics using *any behavioral intervention*, and *social cognitive theory*, and was rated *good* for interventions characterized as using the *transtheoretical model*, *mass media*, *train-the-trainer approach*, and *targeting individuals vs. communities*. *Mixed* robustness was attributed to effect results for *modeling*, *standardized vs. individually-tailored*, *behavioral intervention only*, and *cognitive only vs. cognitive with behavioral* intervention characteristics. Results rated as *poor* for robustness were interventions characterized as *social cognitive vs.*

transtheoretical model, exercise prescription, relapse prevention, mediated delivery (intervention not delivered face-to-face, e.g., by telephone) and *supervised exercise*.

Another meta-analysis team led by Conn, Phillips, Ruppert, and Chase (2012) focused on healthy minority adults as recipients of PA interventions. Understanding the effect of PA interventions on this population was of interest to this current project because the neighborhood and client base of the practice site is more heavily composed of minorities. This study did not use a broad base of interventions, and study questions focused on the effects of supervised PA interventions and verified PA performance on physical fitness, lipids, anthropometric outcomes, risk for diabetes, and mood change. The authors also sought to measure the effect of PA motivation interventions aimed at behavioral outcomes as well as other measures, including quality of life. An array of search strategies were employed in an attempt to limit bias. Heterogeneity was again expected and handled similarly to the approach of Conn et al. (2011). Of 54,893 studies located, 77 remained in the pool and yielded 100 samples, for a total of 21,151 subjects. The selected studies dated from 1990 to 2010.

Among the studies in this meta-analysis, 53 had entirely African-American (AA) subjects and another 15 had over 50% AA participants. Nine studies had all Hispanic subjects and another 10 had subject pools that were over 50% Hispanic. There were some efforts in a minority of the studies to align with the participating communities, for example, by implementing strategies such as inclusion of minority researchers, or planning interventions based on literature about, or input from, the targeted group. Median age across the studies was 44 years. The gender of participants was at a median of 74% female across the included studies. Median minority participation was 14%

among those studies that reported ethnic data. Using physical fitness as a proxy for PA engagement in supervised exercise interventions, effect sizes were .571, $p = .012$, 95% CI [.127, 1.015], for IG vs. CG post-test, and .584, $p < .001$, 95% CI [.431, .737], for IG pre- vs. post-test compared with the CG effect size of .053, $p = .251$. Motivational interventions were effective for increasing PA behavior; effect sizes were .172, $p = .024$, 95% CI [.023, .321], for IG vs. CG post-test, and .312, $p < .001$, 95% CI [.237, .386], for IG pre- vs. post-test. Motivational intervention types were not described in this study.

Limitations of the Conn et al. (2012) meta-analysis included the preponderance of female subjects, which limits generalizability to males, and the significant heterogeneity. Heterogeneity suggests a need for caution when specifying particular intervention choices because it reflects a wide variance of effectiveness among interventions. Socioeconomic factors were not consistently reported, so the role of these characteristics on PA influence is not well understood, although they could play a significant role in health outcomes. Attrition rates were not consistently reported in this body of literature, and the timing of the attrition was not detailed. Treatment integrity was also not reported. Sociocultural acceptability of study treatments by minority populations was not consistently and fully discussed in most reports. This meta-analysis did not break down the types of motivational or supervised PA interventions found in the analyzed studies.

Michie, Abraham, Whittington, McAteer, and Gupta (2009) performed a meta-regression to discover which components of behavior change interventions might be most closely associated with effectiveness for both PA and healthy eating. They were able to identify 26 candidate components of behavior change techniques. Papers included in the analysis contributed 122 evaluations, 51 of which were specific to PA, and another 18

that targeted both PA and healthy eating. Most studies utilized numerous behavior change techniques such that the average was 6.0 methods, $SD = 3.1$, of the 26 possible that were catalogued. Duration of interventions varied from one session, up to 2.5 years, with 80% of the interventions lasting 11 months or less. Multiple sessions were the norm for 84% of the intervention strategies, and follow-up measurement took place as soon as one week after intervention and up to 3 years afterward. In 13% of included studies, a clinically-trained professional (i.e., someone able to deliver direct patient care) delivered the interventions, and non-clinical health professionals (i.e., health educators or trainers) did so in 28%. Non-professionals delivered interventions in the remaining majority 59% of studies. Group format was used in 17% of studies, while 62% were delivered to individuals. The remainder was a combination of individual and group sessions. Site of delivery was divided among the community (55%), PC (25%), and the workplace (20%). The N of 44,747 was drawn mostly from the U.S. (61%), while the United Kingdom accounted for 11%; the rest of Europe, another 11%; Australasia 10%; as well as Japan (4%); and Canada (2%). Nine of the 122 evaluations were of disadvantaged or low-income groups.

The random effects model gave an overall effect size of 0.31, 95% CI [0.26, 0.36], which indicates significant improvement for all outcomes, with PA and healthy eating aggregated. Heterogeneity was considered moderate as suggested by the I^2 of 69%, $Q = 393$, $p < .001$. Separating PA from nutritional behavior change, with an individual N of 18,330 involved in 69 PA evaluations, gave an effect size of 0.32, 95% CI [0.26, 0.38] with heterogeneity I^2 of 58%.

For specific behavioral techniques, *prompting self-monitoring behavior* proved to be the strongest covariate, accounting for 9% of heterogeneity. When *self monitoring* was added to any of four self-regulatory techniques, 17% of heterogeneity was accounted for. The separate PA self-monitoring plus self-regulatory combination resulted in an effect size of 0.38, 95% CI [0.27, 0.49]. Target of the behavior change, and numerous other design features, such as the person delivering the intervention, the duration, individual vs. group, setting (in clinic, workplace, etc.), use of multiple sessions, time to follow-up, and target population, were elements that did not help to distinguish ineffective from effective interventions. Instead, content of the intervention determined effectiveness. Content of the behavioral approach that was most effective was to prompt the individual (or group) to self-monitor and to add one or more self-regulatory techniques (e.g., providing feedback on performance, prompting intention formation, goal setting, or review of behavioral goals). Educational content for PA often promotes self-monitoring through some sort of record that is either written or electronically recorded.

A review by Orrow, Kinmonth, Sanderson, and Sutton (2012) sought to answer whether PC-based PA promotion results in sustained effects on PA levels or physical fitness in sedentary adults. They also wanted to gauge the relative effectiveness of exercise referral interventions compared to other types of PA intervention. Studies were selected if they had a minimum follow-up of 12 months. A total of 15 randomized controlled trials were included with 8,745 subjects aged 17-92 years, 54% of whom were female, and a majority Caucasian in all studies that reported ethnicity. The various intervention types most often included advice or counsel, delivered multiple times, face-to-face, by phone, or both. One trial's counseling method was entirely by phone. At least

two professionals from a variety of disciplines delivered the intervention. Despite attempting to limit study participants to those who were sedentary at baseline, seven studies reported inclusion of participants (i.e., up to 44%) who already met PA guidelines. A number of CGs also received other PA interventions, while other CGs were given an intervention that was clearly, and appropriately, unrelated to PA improvement.

Pooled data from 13 of the studies using a dichotomous outcome (attained target PA level or not) at 12 months, showed small to moderate effects, $OR\ 1.42$, 95% CI [1.17, 1.73], $I^2 = 43\%$. For continuous measures of PA, a standardized mean difference of 0.25 was obtained, 95% CI [0.11, 0.38], $I^2 = 70\%$, 95% CI [27%, 83%]. The exercise referral studies (only three) found a small but non-significant effect on the SR-PA measures at 12 months, $OR\ 1.38$, 95% CI [0.98, 1.95]. Most of the referral schemes were based on the UK model, and end after 12 weeks, rather than offer an ongoing means of facilitating participation through continued elimination or reduction of barriers. Only one agency was housed in a permanent facility, which was commercial, rather than in the community non-profit sector. Problems in the Orrow et al. (2012) study are the poor quality of the RCTs, and the number of participants who were not truly sedentary at baseline. Higher baseline PA level was found by Conn et al. (2011) to result in lower proportional PA improvement.

Another study in the UK by Ward, Phillips, Farr, and Harries (2010) that offered a full 12 month participation scheme with personalized support from a sports scientist did attain significant increases of 547% in PA levels, as well as in other measures of coronary heart disease risk reduction, including general and mental health. UK programs in a

context of socialized healthcare are not likely to be identical to U.S. nonprofit programs, as exists through the Y and its community outreach partners. Therefore, comparisons need to take these differences into consideration.

In terms of the type of PA counsel used in various studies, a diversity of strategies are used including goal-setting and review of goals; relapse prevention discussion; self-monitoring advice; encouragement to engage social support; follow-up from earlier visits; and feedback on progress (Artinian et al., 2010; Greaves et al., 2011; Michie et al., 2009). Blamey and Mutrie (2004) in their review of reviews of one-on-one approaches to PA augmentation, described various methods such as personalized counseling interventions that made use of goal-setting, reinforcement rewards, social support, self-monitoring, and techniques designed to prevent relapse. They reported that across these methods they found a net increase in time spent in PA of 35.4%, IQR 16.7 to 83.3%, and a median increase in expenditure of energy of 64.3%, IQR 31.2 to 85.5%. As a theoretical framework to structure discussions, many counseling strategies include a determination of stage of change to guide how to tailor the approach based on where the individual may be in the process of lifestyle modification.

Research results provide adequate evidence that counsel and advice given to insufficiently active clients in the PC context will result in a number of clients taking action to improve their PA. It is helpful to know that providing PA counsel is not limited to personnel with high-level qualifications and training. The content of counsel need not be structured within a complex cognitive theoretical framework, but rather, will likely work better if it is behaviorally oriented (Conn et al., 2011). Strategies that suggest use of a self-monitoring tool, encourage social support from within the client's cultural

milieu, and assist clients to set goals that are appropriate for their current capacity should all contribute to movement away from a sedentary lifestyle.

Telephone Follow-up

Goode, Reaves, and Eakin (2012) systematically reviewed telephone interventions for both PA and dietary behavior change. Inclusion criteria mandated at least 50% delivery of intervention discussions by telephone in their search period from January 2006 to April 2010. Among the 17 studies that included PA intervention, they counted 51 distinct PA outcomes and found that 33 were in the range of a moderate or better effect size, $d = 0.5$. Only two studies reported on the effects of the number of calls completed, and both found an association between a higher number of completed calls and positive PA outcomes.

Goode et al. (2012) did not provide descriptions of the nature of the telephone interventions or the background of the callers. Their primary interest was that a telephone was the means of delivering some type of interaction at intervals, after an office visit. Their review would indicate that making follow-up phone calls is likely to act as a PA booster and if possible, calls should continue for at least 12 months. The authors believe that the evidence is so strong that RCTs are no longer needed as much as implementation studies on how to integrate telephone strategies into practice.

Based on the review by Greaves et al. (2011), the content of telephone conversations may include a variety of behavioral counseling approaches. They reaffirm that the qualifications of the person who does the phone counsel is not a significant contributing factor. Another important finding from Greaves et al. is that increased

frequency of communication with clients improves behavior change, and therefore, phone contact can enable the addition of this important reinforcement.

Nies and Partridge (2006) compared telephone *counseling* of about 15 minutes in duration, to a briefer 2 to 5 minute call that simply asked for a report on PA of the prior week or two. A 20-minute video that discussed the importance of walking was used for the CG. Calls were made by a trained research assistant weekly for 8 weeks, then every other week for another 16 weeks, totaling 16 calls. Major portions of *phone counseling* content were scripted, with elements such as goal setting, PA benefits, social support, and relapse prevention. Participants in all three study arms came in for assessments at 6 and 12 months that included a 1-mile walk test. All three groups showed significant improvement over baseline at 6 months and sustained comparable levels of improvement at 12 months. What is encouraging is that simple video and telephone interventions attained a clinically meaningful outcome for participants that might be additive when used in combination with counseling or other interventions. The attention-control video that addressed PA as the subject area of the intervention was an intervention in itself.

In another examination of the effectiveness of telephone intervention, a brief telephone session, referred to by the authors as *coaching*, was provided regularly to diabetic clients by paraprofessionals, resulted in increased frequency of exercise, among other outcomes (Sacco, Malone, Morrison, Friedman, & Wells, 2009). After a preliminary intake session lasting close to an hour, subsequent sessions were programmed to last from 15 to 20 minutes and averaged 17.38 min (SD = 2.94) for participants who completed the study. The number of telephone coaching sessions averaged 16.1 (SD = 2.28), with a mean duration of 24.3 weeks. The coaching was

provided in addition to usual care. The paraprofessional callers were all female college undergraduates in psychology who underwent training and were supervised by a licensed clinical psychologist after taking a diabetes education course.

PA was measured by a self-report subscale of the *Summary of Diabetes Self-Care Activities Questionnaire* and was based on frequency of PA engagement. There was a significant standard score mean (SD) increase from -0.27 (2.47) pre-coaching to 1.79 (2.37) after the coaching period. Clients receiving the calls were also found to have lowered depressive symptoms, as assessed by the Patient Health Questionnaire (PHQ-9). An analysis of proposed therapeutic mechanisms showed significant treatment effects on four measures: self-efficacy (SE), healthcare team social support, reinforcement of self-care behavior, and awareness of self-care goals. Of these, it was found in mediation analyses that *reinforcement of self-care behavior* had a significant indirect effect on PA, 95% CI [.44, 2.36]. SE was a significant indirect mediator of depression changes, 95% CI [-2.40, -.13]. The direction appears to be that with telephone coaching, SE alleviates depression, which along with reinforcement of self-care, helps improve frequency of exercise.

Overall, from studies of telephone follow-up for PA improvement, there is indication that providing telephone counsel, advice, or coaching will help promote a change toward active engagement in PA behavior. If calls are made at regular intervals spread out over a longer period of time, so as to provide regular reminders and encouragement, there is a better chance that change will be sustained. Once a program of regular activity is started by a client, the calls may proceed with coaching designed to strategize against a relapse to reduced activity.

Printed, Internet, and Media-Based PA Education

There is recognition of the importance of a guiding role for providers who help clients find good, reliable information, and other educational tips, to increase engagement in PA (Buchholz, Purath, & Rittenmeyer, 2009). A certain amount of information exchange with clients is inherent when discussing PA interventions of any sort. Counseling interventions include provision of information, or elicitation of prior knowledge from memory. One example, is when using the MI technique. One of the difficulties of determining how information-based interventions work has to do with the problem of separating knowledge effects within complex interventions (Blamey & Mutrie, 2004). Conn et al. (2011) could not detect a moderator effect for cognitive and health education intervention characteristics in their meta-analysis. Given their findings are favorable to behavioral and other action-oriented interventions, information should be directed to enable and facilitate behavioral types of activity, such as providing a referral to an instructor-led program while incorporating some *how-to* content.

The potential for a simple yet effective literature-based approach to increase PA in young adults was found to work well in an outpatient orthopedic setting (Schulman et al., 2007). A sample of 80 female clients was asked to complete a quiz on osteoporosis and was then given an informational handout on osteoporosis that included exercise information. At an average follow-up end-point of six months, clients were found to have significantly improved knowledge and had increased their calcium intake and exercise levels over baseline. Of note, the premenopausal sub-group (n = 54) had a more robust response than the older women in the sample. Written information given in the context of an orthopedic clinic (implying presence of a skeletal problem that could

increase perceived susceptibility) along with an osteoporosis quiz taken just prior to receiving the handout, was enough to motivate change in self reported PA in all participants. Context appears to contribute to the impact of information.

Demark-Wahnefeld et al. (2007) conducted a study that compared two types of printed educational materials mailed to participants every six weeks over ten months, with surveys sent in between. Content was designed to help cancer survivors decrease their elevated risk for diseases such as diabetes and osteoporosis. The materials for the IG were tailored to the individual and provided specific advice. For the CG, brochures from the public domain on diet and exercise were provided. Both the IG and CG arms of the study attained significant lifestyle changes over baseline after one year, including SR-PA measured as total minutes per week. The IG gain was significantly higher than the CG, +59.3 min/week vs. +39.2 min/week, $p = .02$. Although the tailored intervention achieved significantly greater gains over the attention-control arm, what was remarkable in this population, is that the materials that were not personalized also helped motivate participants to make significant lifestyle changes.

Equally as simple to administer was a test of a 10-minute osteoporosis educational video prepared at a high-school-level for clients in an outpatient gynecologic clinic (Kulp, Rane & Bachmann, 2004). The video discussed methods to prevent bone loss and stressed the importance of weight-bearing exercise. Those presenting for routine care were enrolled in the study if there was no pre-existing diagnosis of osteopenia or osteoporosis. Both the usual care group and IG were homogeneous at baseline on demographics. The video was viewed prior to the appointment, and a quiz was administered just afterward to document participants' knowledge of osteoporosis-related

prevention measures such as calcium intake and exercise level. Participants were asked to respond to a mailed survey 3 months later (130 out of 195 responded for a 67% response rate). At 3 months, IG members reported significantly greater use of calcium and vitamin D supplements, or had started weightlifting, 13% vs. 2%, $p = .03$. This short, ten-minute video seems to have been an effective intervention where PA was an important element of health promotion. It would appear that by combining interventions, higher PA gains are possible through the intervention of PC office staff.

Community Agency Referral

The Community Preventive Services Task Force (CPSTF, 2013) found that certain community-based interventions are effective for improving PA levels. Among modalities they recommend are those that offer social support such as building buddy-systems and referral to community-based organizations such as the Y. In fact, the USPSTF (2012) recommends strong linkages between these types of organizations and PC offices to facilitate referral. Blamey and Mutrie (2004) in their systematic review note that social support in the community via buddy systems, phone calls, and group discussions resulted in net increases in several measures of PA. Time spent in PA yielded a median net increase of 44.2%, (IQR 19.9 to 45.6%); frequency of exercise participation resulted in a median net increase of 19.6%, (IQR 14.6 to 57.6%); and median net aerobic capacity improved by 4.7%, (IQR 3.3 to 6.1%). Results did not differ if the support was formal or informal in nature, and there was some suggestion that more frequent contact can act as an intervention booster.

Pavey et al. (2011) performed a meta-analysis of exercise referral as a component of PA intervention in PC. Studies were included only if they were RCTs or controlled

trials that had been published in a peer-reviewed journal. The target population was either healthy or had a medical diagnosis. Three criteria were set to qualify as an exercise referral scheme: (a) referral by any professional member of the PC team to a 3rd party PA service provider; (b) the PA program had to be tailored to the referred individual's needs; and (c) the intervention had to provide an initial assessment, then monitoring for the rest of the program participation period. Counsel also had to be included that was more than simple advice, but could be done in person, over the phone, or via written materials. In the analysis the true nature of the intervention could be a combination of counsel, referral, written education, telephone follow-up, and include supervised exercise sessions. The latter exercise-optional condition seems contradictory to what an exercise referral to a PA agency would have as an aim. CGs in this study followed usual care in which simple PA advice was given, or an alternative PA intervention.

Outcomes for Pavey et al. (2011) were PA measured subjectively or objectively, physical fitness, or clinically focused measures such as lipid levels, health-related quality of life, or an adverse event. Eight trials from 13 publications were deemed to merit inclusion, yielding 5,190 participants. CGs are described as having no intervention or *simple advice on PA*. Receiving PA advice was not viewed as constituting an intervention, even if delivered by a healthcare provider. Duration was mostly 10 to 12 weeks and could take place in a clinic, agency, or public parks. The relative probability of achieving 90 to 150 minutes per week of moderate or higher exercise, as pooled across studies, was 16% higher, 95% CI [3%, 30%] compared to usual care at 6 to 12 months

follow-up. Perhaps not surprisingly, the comparison with *alternate PA interventions* was nonsignificant.

Williams, Hendry, France, Lewis, and Wilkinson (2007) in an earlier systematic review of PA referral strategies, included a meta-analysis of a sub-group of six RCTs. The authors used the same defining parameters for PA referral that were later used by Pavey et al. (2011), requiring initial assessment, a program tailored to individual need, and providing monitoring and supervision. Three of the six RCTs were gym-based, and the CG received written PA information. One study compared community-based agencies against usual care, and in another study a walking group was compared to PA advice. The last study compared gym-based referral to a walking group or PA advice. Participation in the programs varied, with a range of only 26% to a high of 92% attendance at the first PA session, with completion of the full program attained by less than half of the participants. A fixed-effects model using intention-to-treat methods that incorporate drop-outs was used in the analysis. A combined relative risk of 1.20, 95% CI [1.06, 1.35], was found in favor of PA programs. Although positive, the weakness of these results may be partly explained by the CGs also receiving in many cases, some sort of PA improvement intervention. If the CGs had been restricted to usual care only, the relative risk of improvement could have been higher.

Composite PA Intervention Sets with Other Characteristics

Assuncao, Gigante, Cardoso, Sartorelli, and Santos (2010) tested a counseling intervention in Brazil on an IG ($n = 120$) and CG ($n = 121$) that were both about 90% female with a mean age of about 40 years. The intervention, which was provided by nutritionists, covered weight loss, improving food choices, and acquisition of active

habits throughout the day including during leisure time. The PA portion of the intervention consisted of a specific recommendation for 30 minutes of leisure-time PA, four or more times per week at moderate intensity. Instruction was also provided for combining PA with routine daily activities. The results of their RCT intention to treat analysis, showed a significant 88.4 min/week increase in leisure time PA ($n = 97, p = .01$) as measured by the self-report International Physical Activity Questionnaire (IPAQ) at 6 month follow-up. The IG members who completed all consultations ($n = 67$) showed an even greater PA increase of 127.8 min/week, $p = .001$.

Crouch, Wilson and Newbury (2011) did a systematic narrative review of a variety of interventions that promoted knowledge of behavioral risk factors for heart disease and propose lifestyle changes, including PA augmentation, to lower the risk of heart disease. Women aged 16 to 65 years who lived in rural areas were the target population for any intervention such as counseling, video, telephone support, workshops, or printed educational material. Variability in outcome measures and interventions did not permit meta-analysis, so narrative review was used. Six of the nine trials had PA as the primary outcome, or as one of a series of outcomes. The authors concluded that PA can be increased and sustained for 12 months through use of these types of interventions. Outcome measures used data from instruments such as timed walk tests, and steps/day.

Armit et al. (2009) studied the effects of advice given by two different professionals on PA. Their IGs included those that received brief advice from a general practitioner only; or general practitioner advice coupled with advice from an exercise scientist; or advice from both the general practitioner and exercise scientist along with a pedometer and some instruction in its use. They found that all three IGs showed an

increase in self-reported PA. The triple IG showed the highest degree of change. However, once again, the advice given by general practitioner and exercise scientist were actually not stand-alone efforts to promote PA behavior change because they added supplementary intervention techniques including use of print media and telephone follow-up to all groups.

Feedback provided to premenopausal adult female participants about their BMD status in a study by Winzenberg et al. (2006) found that those with low BMD achieved greater increases in femoral neck BMD when compared to those who were informed of their normal score. The BMD result was provided along with either one of two educational interventions. The first provided information on osteoporosis using a simple leaflet that described general lifestyle-oriented preventive measures including exercise. The second cohort received a group education intervention that met for 2 hours per week for 4 weeks called the Osteoporosis Prevention and Self-management Course. Both the leaflet and the Osteoporosis Prevention and Self-management Course were associated with statistically similar increases in femoral neck BMD. This approach represents an example of how personalized risk information can shift health beliefs and attitude and impact participation in PA. In this case, clinical effectiveness was judged based on an objective outcome of BMD improvement at the end of the two-year study duration. This study also adds evidence that a simple leaflet method of presenting appropriate information about health risk delivered in the right circumstance, can have as much of an impact on PA outcome as a resource-intensive classroom effort. Informing people of the health risks associated with their current sedentary habits, as part of an intervention set, may help motivate behavior change.

A qualitative review of RCTs by Smitherman, Kendzor, Grothe, and Dubbert (2007) summarized studies that used simple cognitive or behavioral strategies specifically designed to be amenable to implementation in PC settings for promotion of PA. The included studies involved both genders with mean ages that ranged from 38 to 73 years ($N = 4862$). In 5 out of 7 studies when usual care was compared to any combination of one or more simple office-based approaches, the intervention was found to be superior. Major strategies described were categorized under one of five strategy headings: (a) educational, (b) advice, (c) self-monitoring, (d) counseling, or (e) telephone follow-up calls. The only strategy that does not involve person to person conveyance of information was the self-monitoring category. In the other four, contact with a teaching and encouraging provider was involved at some level, or information prepared and delivered by experts was used. Interventions in the reviewed studies were often multifaceted or had conflicting results for the same intervention, making it difficult to define which strategies worked best. The key inference from this qualitative review is that a variety of modest interventions were effective for increasing PA, using simple interactive methods and processes that can be integrated with PC.

Kahn et al. (2002) provided a systematic review of a number of interventions designed to increase PA that were applied at the individual through the aggregate level. Using a logic framework to guide the review, the authors considered the potential to impact PA behavior in three primary domains: (a) information-based determinants; (b) behavioral and social determinants and (c) environmental and policy determinants. When interventions from all three domains target PA behavior, then intermediate outcomes are achieved such as improved aerobic and other physiologic capacities, body composition

changes, skill-based fitness, metabolic fitness and mood. Intermediate outcomes occur after simpler, short-term outcomes such as increased PA levels, but before longer term outcomes that occur at a population level, such as reduced rates of diabetes type 2.

In studies where mixed targeting was employed to address non-PA and PA outcomes simultaneously, targeting them together appears to either not matter, or to provide a synergistic boost. Intervention with counsel, education, demonstration, role-modeling, print and media that combines PA information with dietary change for example, should not diminish the effect of PA interventions. In the PC setting it may not be necessary or practical to separate complementary interventions when clients are willing to target multiple lifestyle-related health concerns at once.

Behavioral counseling messages have been found to result in greater PA improvement if framed from a benefits perspective (*gain-framed*) as opposed to associating inactivity with its costs or the losses one might experience from living a low-PA lifestyle (Latimer et al., 2008). Simple provision to the client of printed or electronic PA information sources appears to add to the momentum toward PA adoption (Jacobson et al., 2005; Peterson, 2007). Telephone follow-up encouraging clients to begin PA or continue with what they have started, also augments other inducements (Calfas et. al., 1996). Using telephone follow-up for the clients of the Family Health Center is time-consuming and therefore, not sustainable. However, when a community partner such as the Y is willing to help by adding phone counselor follow-up, then adding phone support is possible. Increased counsel and education for chronic diseases such as cardiovascular disease, diabetes mellitus, and hyperlipidemia are goals of HP2020 objective PA 11.1 (see Table 1) (USDHHS - HP2020, 2013).

Effective approaches to promote PA in PC settings were reviewed from recent literature. Findings demonstrate that provider counsel and referral to community exercise facilities provides a significant increase for initiating PA in referred clients (Calfas et al., 1996; Jacobson, Strohecker, Compton, & Katz, 2005; Peterson, 2007). The practice improvement project instituted an effective evidence-based intervention set which was expected to result in measurable movement toward fulfillment of PA recommendations for adults.

Attention to Facilitators and Barriers

One barrier to regular exercise cited by residents within areas of cities that have higher crime rates is a sense of risk to engage in outdoor activities, owing to the potential for victimization (Community Research Institute [CRI], 2013). Parks for example, may become hangouts for gang members or are viewed as part of the territory of a criminal enterprise and may no longer be inviting spaces for play and other PA (Christian et. al., 2011; Cutts et al., 2009). Inclement weather is also a limiter for PA engagement in outdoor locations for many people (Elley, Dean, & Kerse, 2007).

Fitness or health clubs and gyms offer protection from the weather and a safer alternative while also extending the possibility of meeting and developing friendships that are mutually encouraging toward staying on track with new PA habits (O'Donovan et al., 2010). Participation in goal-directed classes led by a professional or volunteer role-model who supplies supervised instruction may be available, but are often associated with extra fees above basic membership leading to a financial barrier (O'Donovan et al., 2010). Referral to an indoor facility therefore, is a solution that can eliminate many obstacles, while posing another: the cost of membership and instructional help.

To boost effectiveness of the proposed project further, another principle stratagem can be to employ a referral resource suitable to PC that removes some of the perceived barriers and facilitates engagement with PA over the longer term. Exercise referral to a safe indoor facility is part of what is meant by guiding clients into a suitable *exercise treatment pathway*.

Another barrier-related circumstance for the current project was that the location of the PC and referral sites were in disadvantaged neighborhoods. Candib (2007) and Tamers et al., (2013) note a variety of influences on obesogenic behaviors among low-income, minority and recent-immigrant communities. For instance, social influences seem to both help and hurt. Persons with more friends and higher social support were found to have an associated higher intake of fruit and vegetables, and engage in more vigorous PA on a daily basis. Having more family and neighbor social ties, however, also correlated with more daily consumption of sugar-sweetened drinks, red meat, and fast food (Tamers et al., 2013). Candib calls for systems-thinking by concluding that clinicians must attack the problem of sedentariness and other determinants of obesity and diabetes risk with multiple targets in mind: social, economic, psychologic, familial, political, genetic, and physiologic. The term used to describe the interaction of multiple disease entities with multiple causative influences to make the outcome worse overall is a *syndemic* (Candib, 2007). PA may factor into this synergy negatively, when it is lacking, and for good, by increasing its duration and amount.

Summary Intervention Strategy for this Project

Writing from the perspective of a NP in PC, Peterson (2007) recognized that counseling provides conflicting evidence as to effectiveness, but that some uncertainty

should not stop NPs from continuing to use counsel to try to reverse inactivity. Peterson advised in favor of a variety of methods that included counsel and suggested the use of the Five-As method and printed PA materials. Peterson's perspective represents a published NP viewpoint on the importance of PA improvement in PC. Peterson also describes methods for PA intervention for use by NPs. The recommended techniques align with current evidence from analyses such as Conn et al. (2011) and Michie et al. (2009) that now provide more robust support for the effectiveness of PA counsel that leads to referral and provision of information.

The referral process planned for this project was not focused on a written prescription but rather on recruiting Y assistance for the client. Y referral should prove helpful for removal of numerous barriers while simultaneously adding PA facilitators. Taking cues from Carroll et al. (2008a), regarding the needs of the underserved, provision of a referral in this protocol proffers free access to conveniently located gyms or work-out rooms, at convenient times, and provides expert role models through staff who represent the community. Supervised exercise sessions, as are offered at Y community outreach sites, would provide a substantial incentive for minority participation. Assuncao et al.'s (2010) study suggests that PA sessions held in the evening, during time off for most workers will also facilitate PA engagement. The study also involved nutritionist-led family or buddy-group activities, similar to the methods used at Y community partner locations.

The FHC was not staffed to add telephone follow-up calls as an intervention. In the project, phone support was undertaken instead by Y staff members who had received training in coaching-style approaches to engagement with call recipients. Having the Y as

a partner enabled the addition of phone call intervention to improve PA engagement. This added the Y to the list of PC-community agency collaborative advantages. By whatever means, telephone coaching incorporated over a period of time is likely to give PA a boost for many people (Goode, Reeves, & Eakin, 2012).

Conn et al. (2011) found that cognitive approaches such as health education did not add to the effect size of PA interventions. Therefore those approaches played a minor role in this project, and were offered on the assumption of providing a baseline of information, based on assessment of need. The effect size results for other interventions supported the mix of interventions employed in this project, considering Y referral as offering a behavioral approach, and office visits focused on individuals in face-to-face contact with staff. Having and making judicious choices among interventions was supported by the amount of heterogeneity in Conn et al.'s (2011) study, since it underlines that interventions do not all have similar effects. Therefore, the moderator analyses provided by Conn et al. (2011) specified the most important information regarding what interventions were most effective.

This project helped providers recognize the importance of utilizing strategies to improve self efficacy for exercise through a combination of counsel that included knowledge enhancement and referral to an innovative PA community outreach. Initiation of PA that is inspired by counsel from trusted PC providers should help clients integrate an exercise routine into their rhythm of life. Educational content that is reviewed face-to-face as a part of PA counseling with a provider, can produce a personalized message. An educational flyer and phone calls for follow up will lend encouragement and offer resources. The combination of these interventions is expected to draw at-risk,

insufficiently active adults into taking action that may in the longer-term preserve or improve their physical and mental health (Muller-Riemenschneider, Reinhold, Nocon & Willich, 2008).

CHAPTER 3

CONCEPTUAL FRAMEWORK

A practice concern for PC clinicians is how to structure an intervention for insufficiently active adults in order to facilitate adoption of regular PA as a lifestyle. Rejeski, Brawley, McAuley, and Rapp (2000) explored mediating variables of behavior-change and noted that their descriptors originate in psychological theory. Therefore, they believe that progress in the pursuit of behavior change is slowed when it operates independently from theory. Another key point they highlight is that psychological constructs are dynamic. For example, perception change may occur within days or weeks after taking a baseline attitude assessment. Measurement of outcomes must therefore consider that a difference may be uncovered that is independent of intervention effects. With these concerns in mind, the theoretical underpinnings of PA behavioral change through PC intervention will be explored. Also, a logic model framework for organizing this author's proposed approach to integration of practice modification is presented.

Sutton (2011) in his examination of the contribution of behavioral science to PC, suggests a number of principles to be followed for the use of theory applied to behavior-change interventions. First, a behavioral target must be defined. If at all possible, the behavior should have valid and reliable measures and outcomes that are clinically meaningful. Sutton provides an example where an increase in moderate as opposed to strenuous activity was used as the target behavior. This behavioral target was chosen because evidence showed that moderate PA level is most closely associated with future diabetes risk and is more achievable and acceptable for sedentary individuals.

Second, Sutton (2011) stipulates that interventions should be indicated by the theory that will target causal relationships among constructs. In this project for example, seeking to reduce *barriers* and take advantage of *facilitators* that boost *self-efficacy* (SE) aligns theoretical constructs with interventions that are expected to alter them in ways that theory predicts will help achieve the desired outcomes. A more subtle application of theory is that developing *knowledge* as a component of intervention is often assumed, and does not seem to strongly affect outcomes directly, but acts as a foundation upon which directly causal theoretical concepts are built. For example, knowledge plays an inherent role in counsel, advice, telephone coaching, and use of literature and internet-based approaches to motivate improved PA.

Sutton's (2011) third point is that the theory components should be evaluated using the following criteria: (a) empirical support provides evidence that the purported behavioral determinants have been shown to influence outcomes; (b) constructs are clearly defined with explanation of specific causal relationships; and (c) clear indication of how the determinants of behavior may be modified. In this chapter, the theory base for the interventions selected for the project will be demonstrated. To help select interventions, theory constructs need to have clear definitions.

Lastly, Sutton (2011) cautions that although helpful, interventions can never be based entirely on theory. This is because of the large number of potential variables that may be specified in research and logistically, cannot be. Rejeski et al. (2000) add to this discussion, pointing out that intervention effects can differ within the same subject across time, much as they do between subjects at a specific point in time. They also found that mediators of PA, such as satisfaction with appearance, can differ based on demographic

variables of race, age, and gender. There is still much that is unknown about how best to apply variables such as the ideal number of sessions, the optimum intervals between applications of an intervention, and whether group or one-to-one administration will be most effective in a given application. With these cautions taken into consideration, various frameworks informed the project interventions.

Conceptual Frameworks for PA Interventions

Social Cognitive Theory and Self-Efficacy

Bandura's (1986) social cognitive theory (SCT) has frequently been used to structure interventions and describes cognitive elements that comprise the change process for health behavior (Strecher, DeVellis, Becker & Rosenstock, 1986). A central concept is the role of SE, which is defined as "beliefs about capabilities of performing *specific* behaviors in *particular situations*" (Strecher et al., 1986, p. 74). For this project the role of SE is in relation to exercise (SEE), meaning the participants' beliefs about their abilities to engage in PA or exercise.

In the qualitative portion of their review, Williams et al. (2007) identified personal PA barriers to consider when designing interventions. They include poor body image, low SEE, personal time management, and inadequate social support, as well as PA agency-related barriers involving inadequate supervision, inconvenient hours, and an intimidating environment, as potential impediments to full participation. Personal and agency-related barrier perceptions must be mitigated when offering access to community resources, such as Y programming.

Gammage and Klentrou (2011) found that both high SEE and health motivation contributed to participation in PA. Allison and Keller (2004) implemented a self-efficacy

coaching intervention in older adults post cardiac event and were successful in facilitating greater PA performance. These studies among others continue the legacy that lends confidence in SE as a tool for exercise promotion (Haworth & Young, 2009; Jones, Harris, Waller, & Coggins, 2005; Magee, Stuber, & Schmutte, 2008; Pender, Murdaugh, & Parsons, 2006; Piaseu, Belza, & Mitchell, 2001). Higher SEE appears to be a valuable predictor of engagement in PA (Gammage & Klentrou, 2011; Hsieh, Wang, McCubbin, Zhang, & Inouye, 2008; Schmiede, Aiken, Sander, & Gerend, 2007; Wallace, 2002). Analyzing how an intervention influences SEE may help us to understand how it mediates a change in PA behavior.

Several researchers have built models primarily hybridized from SCT and the Health Promotion Model (HPM, Pender et al., 2006) which advanced the work of Bandura (1986). Piaseu, Schepp and Belza (2002) proposed and tested a theoretical model to describe and diagram the linkages between knowledge, (health belief) attitudes, and SE that first separately and individually, then synergistically combined to affect the outcome of exercise participation. In their model, knowledge is a key component that *directly* influences exercise performance. Knowledge also influences exercise via *indirect* (secondary) pathways, such as when knowledge positively impacts attitudes and SE. When attitudes become more positive, and general SE is strengthened, attitudes and SE bolster PA outcomes.

Hsieh et al. (2008) developed a similar path model that demonstrated a significant effect for knowledge, social support and social capital on boosting SEE. Social capital is the influence of institutions, norms and relationships that help individuals to function in society (World Bank, 2011). The influence of social capital subsequently combines with

the influence of SEE to produce a direct impact on exercise performance. In their model, a direct effect for knowledge on exercise performance was not proposed or tested. Of these two models, the one proposed by Piaseau et al. (2002) seems to have captured several essential pathways through which counseling, or other information-sharing methods might impact PA behavior. Both models depict knowledge as either directly effective for increasing PA behavior, or acting as a supporting agent to other factors, for bringing about change in PA.

Schmiege et al. (2007) also developed a model whereby specific types of information and perceptions impact SEE. Barrier and benefit perceptions influence SEE, and together with SEE, influence intention to exercise, resulting in exercise behavior. The first experience with exercise then provides feedback to intention, and when positive, may contribute to further exercise. This model lends insight into potential aims for the knowledge content of an intervention, such as societal and peer *descriptive* and *injunctive norms* for exercise. An educational intervention designed with this model in mind could describe what others in the community are doing for exercise (provide descriptive norms) and what is recommended for exercise from guidelines (provide injunctive norms). Information meant to reinforce perceived general benefits of exercise and diminish perceived barriers would further strengthen the educational (knowledge) intervention using the model's concepts.

Sustaining PA is a concern that may be answered by the Y's commitment to a long-term presence via programs in the community. Ongoing PC attention to PA assessment at sequential visits highlights to staff and clients that it is a permanent vital sign. The IPAQ, administered regularly, can give personalized feedback on performance,

and along with Y referral, prompts intention, goal setting, and opportunity for review of goals at subsequent office visits.

The Health Promotion Model

The U.S. Department of Health and Human Services- National Institutes of Health (USDHHS-NIH, 2005) in their production of a theory guide for health promotion, discuss an *ecological approach* before outlining a number of contributing theories applicable to health promotion. Utilizing an ecological approach, one needs to consider multiple sources of influence on behavior: interpersonal, intrapersonal, and extending further to institutional, community, and wider influences such as public policy. This view is found to match the holistic view of nursing, which regards health as the product of more than just the individual's biophysical processes.

Even from the earlier editions of the HPM, Pender et al. (2006) have also developed a comprehensive *ecological approach* to the problem of promoting healthy behavior change. Theory elements of the HPM, that appear to provide the most consistent relationship to subsequent behavior are (a) *prior related behavior*, which is whether the person has engaged in the same or similar target behaviors in the past; (b) *perceived benefits of action*, which are the anticipated returns that will occur as a result of enacting the behavior; (c) *perceived barriers to action*, which are the inaccessibility, inconvenience, expense, difficulty, and hurdles to overcome in order to adopt a behavior; (d) *self-efficacy*, the belief that one is capable of carrying out the new behavior; (e) *interpersonal influences*, comprised of a person's thoughts about the attitudes, behavior and beliefs of others; and (f) *situational influences*, which are perceptions of the

environment, demands, and available options surrounding the behavior (Pender et al., 2006). In addition, it is thought helpful to elicit a commitment to start the new behavior.

Availability of several popular, enjoyable, workout regimes to provide choices, furthers affective facilitation of PA adoption. The potential for finding work-out buddies among a peer group that already attend Y community sites, or inviting friends and family along, which is encouraged, may add to the social benefit of becoming active and inspire remaining adherent to a PA schedule. These options are forms of social support and social capital for the underserved and when measured, most often increase SEE.

Counseling that applies a mix of theoretical underpinnings, and interventions being performed by staff directly involved in patient care who are familiar with their clients will allow individualization. Carroll et al. (2008a) add a caution to focus on fewer new concepts when providing guidance to avoid overloading clients with new information. Mass media contributions to knowledge and interpersonal and situational influences may come from current attention given to PA in campaigns such as Michigan's 4x4 initiative (MDCH, 2012), but are not expected to play a significant role in modifying PA behavior by themselves. More direct, personal influence is needed to bolster SEE and reduce perceived barriers to PA. Getting a successful start on PA will build a history of engagement and competence in one's memory in order to build future ongoing willingness to participate in PA. Pender et al. (2006), and Anshel (2006), as well as the USDHHS-NIH (2005) include the transtheoretical model as another component of theoretical support to consider for various types of health behavior change including exercise.

The Transtheoretical Model

Velicer, Prochaska, Fava, Norman, and Redding (1998) describe five stages for understanding the process of change called the transtheoretical model (TTM), also known as the stages of change (SOC) Model. The TTM comprises the following stages: (a) *pre-contemplation*, in which the person has no intention of making the targeted behavior change in the next 6 months or is unaware of the need for the change; (b) *contemplation*, in which the person considers making the change within the next 6 months; (c) *preparation*, in which the individual is planning and preparing for the behavior change with intent to act within 1 month; (d) *action*, in which the person is actively involved in changing the behavior from the point at which the new behavior started and continuing for 6 months; and (e) *maintenance*, at which time action has passed 6 months and continues until the new behavior is considered well established (Velicer et al., 1998).

The TTM adds chronology to the process of change and provides clues as to what change strategies to employ at any particular stage based on probable subject attitudes toward the change that are dictated by the stage. Besides a chronology of change, *decisional balance* as expressed in a person's weighting of the personal significance of *pros and cons* for or against change, are supporting constructs of the TTM (Velicer et al., 1998). Decisional balance is one example of how the SOC determination points to interventions. Interventions are designed to increase a person's relative weighting of pros and to reduce perceptions of cons in order to move toward, accomplish, and sustain behavior change. Another set of constructs that guide intervention based on the TTM/SOC are ten *processes of change* that are either *experiential* or *behavioral* in application (Velicer et al., 1998).

Breckon, Johnston, and Hutchison (2008) reviewed consistency of content and the competency level of personnel who provide counseling to improve PA. They note that the majority of PA counseling strategies rely on the TTM for guidance. However, they were unable to draw any conclusions about treatment fidelity because this was underreported.

Tuah et al. (2011) wrote an intervention review where the TTM was the theoretical model used as a basis for the intervention to impact diet and exercise among overweight and obese adults. Only five studies met their inclusion criteria, but a sizeable 3910 participants in both arms of the randomized controlled trials (RCT) were evaluated. Intervention length varied from 6 to 24 months, the risk of bias was thought to be high, and the TTM was used inconsistently. The authors explained that two included trials used the TTM to only assess participant's SOC while two other trials also used it to structure interventions. One trial used the TTM to determine participant's SOC specifically toward PA behavior. If the TTM is used only to assign SOC without informing the intervention approaches, then the TTM is not being used as intended (Velicer et al., 1998). Among the significant positive outcomes was an increase in various measures of PA behavior (e.g. self-reported minutes/week, steps per day, etc.), though there was no conclusive evidence for sustained weight loss. Despite these shortcomings, the broad support and application of the TTM/SOC model merits its inclusion as a framework to guide PA counseling.

A final theory that guides the choice of questions used in short PA counseling sessions, is motivational interviewing (MI) described by Miller and Rollnick (2002). Dart (2011) comprehends MI as an outgrowth of the TTM, seeing it as a *guiding theory*.

What MI adds principally, are specific questions and ways of inquiring to ascertain SOC as well as client readiness (motivation) that derive from a framework that leaves the client in control of the choice and the impetus for change. The MI technique directs the counselor to communicate *empathy*, buttress *self-efficacy*, *roll* with any resistance to change, and attempt to develop client recognition of the *discrepancy* between where they are and where they say they would like to be (Dart, 2011; Miller & Rollnick, 2002).

Summary of the Conceptual Framework for the Intervention

A review of the above models and the theories from which they have been derived urges healthcare providers to include various educational, motivational, and information-sharing interventions to fill our SE-building toolbox and shift decisional balance toward lifestyle change. Using any combination of these methods should boost PA:

- convey knowledge about PA;
- provide information about general and specific benefits that can be anticipated as a result of PA;
- attempt to diminish perceived barriers to exercise;
- warn of potential susceptibility and the severity of chronic disease outcomes;
- describe and appeal to descriptive and injunctive norms;
- provide actual (through demonstration or ongoing guidance with a trainer) and/or vicarious experience with exercise;
- expose sedentary adults to social interaction that is likely to improve motivation
- update or modify mistaken health beliefs;
- apply persuasion; and
- ask for commitment to behavior change.

Implementation of PA Interventions Using a Logic Model

Logic models (LM) have been used for program and project planning, management, and evaluation for grant application and reporting purposes (Taylor-Powell, Jones, & Henert, 2002; W. K. Kellogg Foundation, 1998). They have also been applied to health promotion, health education and other PC activities (Lane & Martin, 2005) including those of a nurse-managed community health clinic similar to the implementation site for this project (Dykeman, MacIntosh, Seaman, & Davidson, 2003). In this project a logic model was used to organize inputs and activities targeted to attain project outcomes (see Figure 1). Assumptions, participants, and external influences were also listed for consideration and awareness.

The basic form of a LM consists of a defined situation that requires action or change, into which inputs are invested in order to develop outputs. The inputs produce outputs that achieve particular outcomes or impact, which address the situation or problem and resolve it, or at least move it in the desired direction (University of Wisconsin [UW]-Extension, 2002). Outputs are further subdivided into activities and participation, and outcomes into expected short, medium, and long term impacts. To help in the education of project participants about logic models, Taylor-Powell and Henert (2008) have produced a free training guide that can be utilized in the project implementation to give contributors any needed background on the framework's general structure.

MacPhee (2009) states that logic models begin by determining what the endpoint will be. Stakeholders ask, "What do we want to accomplish?" The question focuses on the situation that is thought to require change in a particular direction toward the

projected outcome. In the case of this project, increased PA levels among previously sedentary adult clients served by community-based PC health centers is the desired medium-term outcome. It was believed that achieving the medium-term outcome would grow out of the short-term outcome of increased knowledge and motivation to change, along with some preliminary PA action steps. Throughout the process of development and implementation, stakeholders would need to be consulted for validation of the main program elements in an iterative process.

Goldman and Schmalz (2006) give an overview of logic model use and list advantages such as: (a) develops into a visual aid that facilitates communication; (b) allows rapid communication of project elements to stakeholders; (c) places project elements in their context; (d) uncovers assumptions; (e) helps assure that critical outcomes and processes are not overlooked; (f) enhances accountability among stakeholders; (g) indicates data needs; (h) guides interpretation of information on the basis of a framework; (i) minimizes risk of project failure due to inadequate organization; (j) integrates evidence-based practice and practical knowledge gained from experience; (k) permits comparison of the actual project with the ideal project depicted in the plan; (l) portrays options for allocating resources and prioritization; and (m) enhances learning. Given the number of stakeholders at different geographic locations included in this project, it was helpful to utilize a model that enhanced rapid and clear communication of project elements and helped stakeholders understand their roles in their contexts. It was assumed that if use of a logic model enhanced explanatory power of the project for the author and the stakeholders so that they had a common understanding, then there would

be a better chance of attaining the short term outcomes and sustain effort over time, until the medium- and long-term impacts would also be reached.

Logic Model Inputs

Inputs are comprised of the resources brought to bear on the situation that is being addressed (UW-Extension, 2002). They represent the contributions of people, material and effort by program participants that enable the creation of outputs. Inputs are influenced by the situation the project attempts to improve and the priorities determined for the project. Inputs for this undertaking involved:

- human resources (the author, practitioners and other staff of the health center, exercise instructors, leaders of community organizations such as the Y, etc.);
- the research and evidence base for the project;
- time (for meetings, to work on protocols and learn new approaches, etc.);
- partnership or informal agreements (Y, community sites, and the health center);
- tools for measurement of outcomes;
- communication between the stakeholders (Y, FHC staff, DNP student)
- budget allocations for any associated costs; and
- materials used for teaching or as part of interventions.

Project implementers need to be aware of explicit assumptions that influence inputs and outputs and which themselves, in-turn, influence the content of a project's assumptions. Examples of some of the assumptions for this project were that the intervention(s) would result in changed behavior in at least some of the targeted population and that the participating health center staff would want to invest resources in seeing the health problem of adults with low PA levels reversed. Another set of

assumptions involving the referral resource was that the Y community exercise classes would be able to accommodate the referrals made, and that the community program would continue to be available for free or at very low cost for the foreseeable future.

Logic Model Outputs

The outputs are defined as the developed and planned meetings, services, products, training, communication, support, counseling and other *activities* enacted by the project *participants* (UW-Extension, 2002). The activities are intended to be performed by people (clients, agencies, customers, decision-makers) who are either participants in project development, or targets of other activities designed to attain project outcomes. McPhee (2009) places *activities* in a separate category occurring sequentially between inputs and outputs. They are referred to as *empowering activities* that solidify the relationship among partners. Outputs then become more narrowly defined as the *deliverables* that are the result of both the inputs and activities. An example of a deliverable is a memorandum of understanding between the Y and the Family Health Center governing the referral process, signed by responsible parties of both organizations.

The advantage of McPhee's arrangement of a LM is that it highlights *successful* implementation of activities as distinct from the planning and preliminary, incomplete, or ineffective implementation of activities. The disadvantage is that addition of the concept of *deliverables* creates an extra category out of meaning that this author believes is included in the *outcome* construct of a LM. The approach in this project was in accord with the streamlined UW-Extension approach to LMs which answers the project productivity concern with attention to activities that produce certain deliverables as *outcomes*.

Logic Model Outcomes, Impact and Goals

Outcomes may also be referred to as the *impact* of the activity output that affects the target population (UW-Extension, 2002). The outcomes are often subdivided into short-, medium-, and long-term impacts that are expected as a result of the output activities. In the short-term one might only expect increases in awareness, knowledge, opinions, aspirations, and skills, as a result of *learning and socialization* in and through the output activities. Later, in the medium-term, these learned attributes should translate into outcome *actions* such as behavior changes, new practices, policy change, social action or decisions by individuals, groups or establishments. Still later in time, this project was designed to impact *conditions* such as health, social, economic, and environmental circumstances. Medium- and long-term goals may take years to reach, so this project can only report on short-term goals.

Anticipated *short-term outcomes* of this project's *output activities* was the implementation of the IPAQ as a PA assessment tool, and healthcare providers having effective PA-augmenting interventions available to them. After the tools were in place, insufficiently active clients were expected to gain knowledge and awareness of the importance of PA, and strategies for how it can be increased during their visits to the FHC. The intervention set was expected to positively impact their decisional balance toward making PA behavior changes. The practice site's leadership, assisted by the DNP student, enacted policy change to reflect the PA assessment and intervention knowledge gained from information shared in meetings and training sessions (UW, 2002). In the medium-term, actions stimulated by intervention components were expected to result in

attendance at exercise classes and performance of other self-selected PA among insufficiently active clients of the FHC.

It is also important to note that some outcomes may be unintended and negative, or in the case of an ineffective intervention there may be no change or a neutral outcome. In these cases the logic model allows for a new iteration to take place in which the lessons learned are applied at the input and output level to eventually arrive at a desired or improved outcome.

In the UW-Extension (2002) application of logic models, the term *impact* is considered synonymous with the long-term outcome and is thought of as the *ultimate goal(s)* of the project or program. Long term goals are achieved later on, perhaps years or decades later. For health-related interventions, these outcome goals might be expressed at a population level. A population impact one might expect from long-term engagement in PA by previously sedentary adults are lower rates of diabetes mellitus Type 2, cardiovascular disease, osteoporosis, obesity, cancer, and depression.

Finally, *external factors* are understood to both influence and be influenced by, the project and its outcomes (Taylor-Powell, Jones, & Henert, 2002). These factors include local economic conditions, culture, housing, demographics, politics, experience of stakeholders and participants and media influence that could occur incidentally or purposefully. It may have been worthwhile to publicize the project through media outlets that pick up on the human-interest side of the story. This could have promoted awareness of various aspects of the program such as referral and existence of the free exercise outlets. This unpaid advertisement in the region could have augmented anticipated

effects from the collaborative intervention, or this attention could have been viewed as a component of the project as a purposeful, community-wide, intervention *booster*.

Summary

Components of psychological, counseling, and health promotion theories that have been applied to encourage PA informed the interventions recommended by this project. Ecological approaches such as those described by the HPM (Pender et al. 2006) and the USDHHS-NIH (2005) and promoted by Anshel (2006) integrate several major lines of explanatory behavioral philosophies. Thus, a variety of theoretical concepts such as SEE, social support, SOC, and decisional balance guided and influenced the interventions recommended to the FHC for implementation.

A logic model was used to organize the project from preparation of stakeholders through evaluation of short-term outcomes. Medium- and long-term outcomes influenced the formation of the short-term outcomes. The logic model guided activities such as teaching FHC staff about the importance of PA assessment and provided a way to rapidly communicate program aims and methods. The logic model also facilitated integration of stakeholder ideas into project flow and output content.

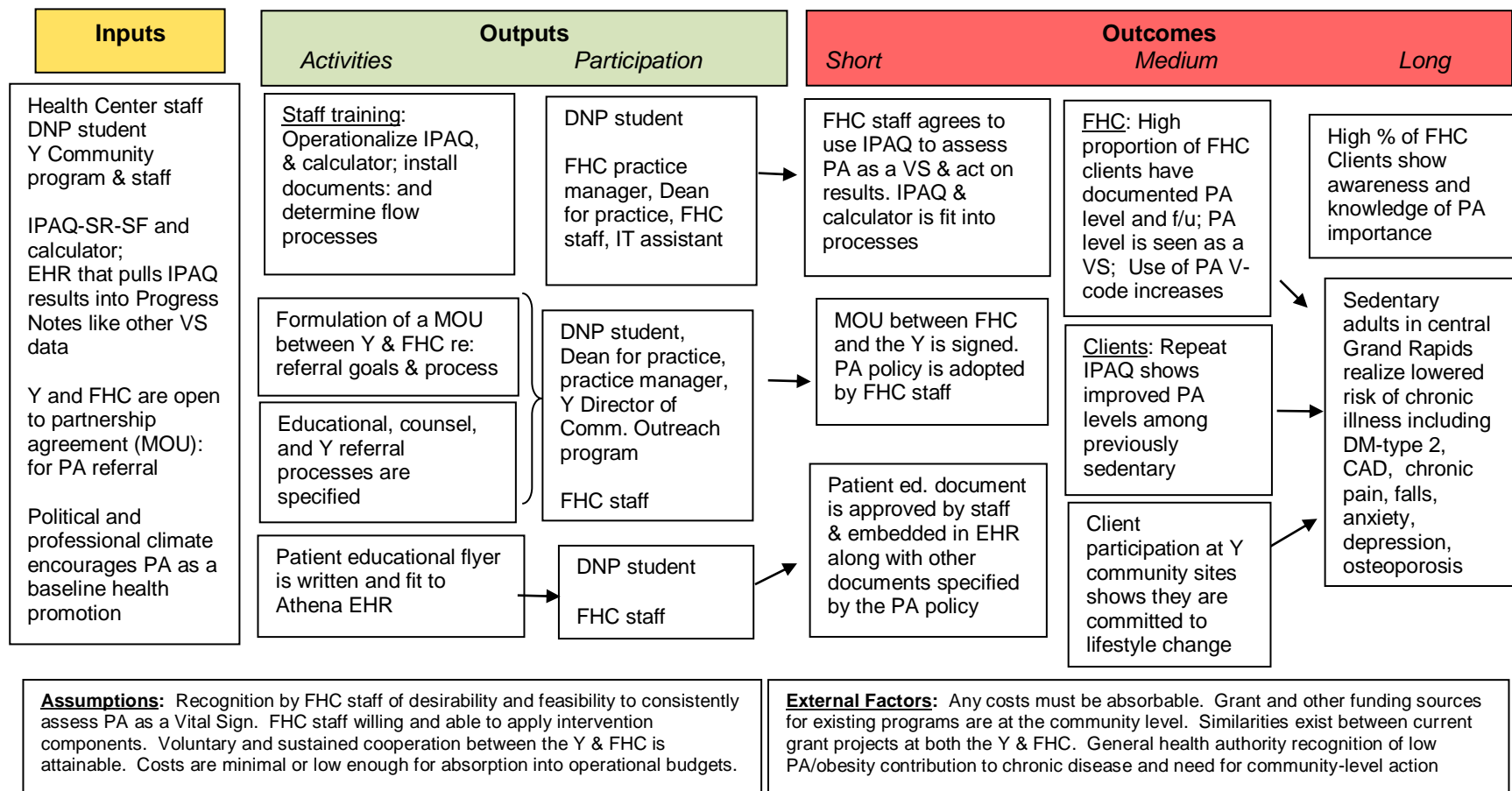


Figure 1. Logic Model for PA assessment and intervention in primary care. DNP = Doctor of Nursing Practice; FHC = Family Health Center; IPAQ (-SR-SF) = International Physical Activity Questionnaire- short form- self report; MOU = memorandum of understanding; Y = YMCA formerly known as the Young Men's Christian Association. Adapted from "Logical Model – Templates," by Division of Cooperative Extension, University of Wisconsin-Extension, 2009. Retrieved from <http://www.uwex.edu/ces/pdande/evaluation/evallogicmodelworksheets.html>. Copyright 1996 Board of Regents of the University of Wisconsin System

CHAPTER 4

METHODS

A GVSU-owned nurse-managed health center was the practice site chosen for implementation of a set of PA assessment and intervention improvements. PC office practices are a natural point of connection for adults in the community with professionals who may capably evaluate PA levels and general health status for the purpose of determining the need for, and appropriateness of recommendations for participation in PA. The International Physical Activity Questionnaire (IPAQ) was put in place in this practice as a standardized method for assessing habitual PA levels. The IPAQ will be discussed in more detail later in this chapter.

Screening clients for PA level needs to be carried out to discover whether there is an individual need for PA augmentation, and when a deficit is found, to implement evidence-based interventions that work well and are practical in this setting. When PA assessment is viewed as a vital sign, as this project recommends, then ongoing attention to the results of the assessment is likely to prompt discussion of PA as a significant health concern, much like blood pressure.

Another goal of this project was the adoption by the FHC of an evidence-based *intervention set* ready for delivery when a client's activity level is found to be in the *low/sedentary* or *moderate* category on the IPAQ. Assessment and intervention tools were fit to flow processes that included documentation in the electronic health record. To operationalize one of the key interventions, partnership with the Y for referral to their community sites was negotiated and formalized in a memorandum of understanding. A policy was written that codified the tools and processes.

Location

This project took place in Grand Rapids, Michigan at a PC office and Y location in the near-southeast and southwest quadrants of the city. This area was at the time of the project undergoing rapid change as developers found value in the structure and charm of old buildings that had long been neglected. Their development strategy was revitalizing the downtown area and extending a combination of residential condominium, apartment, and commercial ventures further southeast. This neighborhood was known for a high concentration of mission-type outreach projects to the homeless and transient. Showing ongoing commitment to the needs of the poor, the non-profit community organization called the Dwelling Place (dwellingplacegr.org, n.d.) owned and operated a number of properties which were once dilapidated or underused buildings that became subsidized apartments and commercial enterprises. The economically disparate demographic groups of homeless and low-income residents coexisted with higher-income condominium and apartment-dwellers in the realization of a vision for improved conditions for the previous residents and transients, while bringing modern urban residential and commercial vitality to this area.

Target Client Population, Inclusion, Exclusion and Risks

The target population for PA increase was insufficiently active adults aged 18 through 64 years who in the judgment of clinical staff did not have a condition that would preclude engagement in PA. When the PA assessment tools were first trialed, it was decided that clients would be assessed using the IPAQ if they presented for a well or chronic disease follow-up visit at the Family Health Center (FHC). Clients coming in for

same-day sick or nurse visits were excluded from PA assessment, because PA intervention is unlikely to be a priority.

The previous description of the location and university affiliation of the FHC provide the backdrop for the mix of clients: some were low income, but the client mix also included a number of students and others who resided outside the local neighborhood. Some FHC clients traveled from outside the immediate area because of prior relationships with particular providers, or because costs for care were lower than elsewhere.

Clients who were offered referral but refused were expected to still receive the PA interventions they were receptive to, such as provider counsel and printed information (or electronically available via the patient portal) on the importance of PA, how to get started, and how to set some preliminary goals. This practice change was facilitated by the creation of a policy to codify PA assessment, intervention, and documentation as an expected norm for client evaluation. The policy developed during the project states that interaction on PA is to be documented in the EHR with appropriate use of ICD-9 codes to ensure that staff will factor these interventions into the charges for the visit and produce income to compensate for addressing PA as a health issue during office visits.

Risks to clients thought to arise with behavioral interventions included possible disruption of the clinician–client relationship, increased anxiety, loss of opportunity to engage the client with other interventions, paradoxical decrease in PA behaviors, and injury from participation in exercise. Benefits to clients included the opportunity to be informed and to engage in healthful exercise whether on their own, or through programs

offered by the Y. Extra personal attention has the potential to stimulate improved duration and adherence to an exercise program.

Exercise safety when commencing a PA augmentation program merits mention. Nurse practitioners evaluated PA readiness as part of ongoing assessment of clients in the practice. In general, it is thought that for the majority of persons without known limiting health conditions, starting with moderate-intensity activities *they are currently able to perform for 30 minutes* should be safe (Pescatello, Arena, Riebe, & Thompson, 2013; Peterson, 2007). Remaining sedentary actually poses a higher health risk than the low, transient risk increase of an adverse event from exercise (Warburton et al., 2011). Clients must be considered capable of engaging in PA by the healthcare professionals who evaluate them in the normal course of a visit. Certain health conditions will most often modify and only occasionally disqualify clients from exercise participation based on the decision of healthcare professionals involved in their care at the time of the visit.

If needed, an evidence-based tool made available by this project for the purpose of PA readiness assessment is the 2014 PAR-Q+ (2014 PAR-Q+ Collaboration, 2014). The 2014 PAR-Q+ is a rapid self-report tool that screens for PA clearance or the need to apply a second level of screening. The evidence-based tool available at the second level is the ePARmed-X+ (Warburton, 2013) which is also a self-report instrument that yields a recommendation page that may be printed and saved. At the time of the project the instrument itself was only available on-line. Versions of the PAR-Q+ have been in use since 1988 and were the subject of an extensive review by Warburton et al., (2011). Since qualified healthcare professionals decide when to implement PA interventions for

particular clients, no added risk burden beyond usual care was expected when supported by these tools.

Key Stakeholders

PC and certain specialty providers who have a keen interest in limiting disease processes and complications that are linked to PA are among the stakeholders for PA improvement within healthcare. One could argue that most healthcare providers should assess PA and intervene when appropriate. Given the wide array of health implications for remaining sedentary, most types of medical and nursing specialties such as cardiology, rheumatology, gynecology, endocrinology, and psychiatry; and other healthcare professions such as physical therapy and chiropractic, should concern themselves with addressing PA. When diverse providers ask about PA and explain its relationship to the particular health issue(s) at hand, clients begin to understand that adequate PA is a basic component of good self-care.

It was important that the GVSU-FHC staff adopt the intervention set and demonstrate willingness to refer sedentary clients to Y programs that promote PA. There was one family nurse practitioner (NP) and two registered nurses in this practice setting who regularly cared for adult clients. Another two providers were pediatric NPs who did not generally see adult clients. However, there was value for pediatric NPs too, because they might intervene with older adolescents, parents, and other adult care providers, so they can role-model good PA habits to the children in their care.

Both for-profit businesses and non-profit organizations that offer access to commercial-grade exercise equipment, group classes, individual instruction, and facilities such as court-sports, dance studios, tracks, and pools were among this project's

stakeholders. The Y operates as a non-profit and includes those who are economically disadvantaged as beneficiaries of its outreach mission. It was an important stakeholder in this project and had a track record of integrating evidence-based programs into the community. Within the Y organization the Director of Healthy Living Programs and the Associate Executive Director of Community Outreach had responsibility for programming that extended into the neighborhoods from the main downtown Y campus. They were the key decision-makers who oversaw Y interests and aspirations for enlisting healthcare partnerships.

The Greater Grand Rapids Y's initiatives in the creation of inner-city community sites hosted in churches, schools, and community organizations were examples of the organization's commitment to bring beneficial PA and other health-promoting programming into inner-city neighborhoods. The Y Director of Healthy Living programs had an interest in seeing partnering sites used to capacity. The desire to fill community sites to capacity and justify their continuance was noted to be a problem that could be resolved by greater awareness and efficient referral of FHC clients. In order to improve community-based Y program attendance, and thereby spread the health benefits, this project created a partnership with the FHC. Meetings were organized and set up between leaders in both organizations to present the purpose and location of Y community outreach sites. Staff members developed a fuller appreciation for the extent of the Y's community outreach and how its programs complement PC lifestyle change goals.

With the implementation of the Affordable Care Act during the project period, insurance companies and employee health professionals were taking more interest in finding innovative ways to decrease healthcare costs through inducements to PA behavior

change. As stakeholders, they could assist with the propagation of successful behavior change by offering financial incentives either directly to their beneficiaries, or to practices that achieve target PA outcome levels. M. Smearman, a billing specialist at the FHC (personal communication, December 9, 2013), estimated the breakdown of FHC payers for adult care in the age 18 to 64 years demographic, as 50% Priority Health Medicaid, 10% straight Medicaid, 20% Blue Cross/Blue Shield (BC/BS), and 20% private Priority Health or Cofinity.

Another group of stakeholders concerned with economic impacts were the officers and financial managers of the Family Health Center. A key concern they had was whether there would be a burden of extra time needed to assess PA and intervene that would add to workflow processes. A significant increase of even several minutes per client could place a burden on office visit numbers by cumulatively reducing provider capacity by one or two client visits (with loss of accompanying charges) per day.

A set of stakeholders that were outside the scope of this project included city planners who develop spaces and infrastructure that facilitate integration of PA into everyday activities. An example was the addition of bicycle lanes in various neighborhoods of Grand Rapids. Though they were indirect stakeholders for this project, city planners were important for their influence on policy while the author was attempting to affect this community-wide, pervasive health issue. Environmental cues to PA behavior change by means of the built environment contribute to improving PA levels in the long-term at a population level (Redding et al, 2000).

A final group of stakeholders was the population of relatively inactive adults. Environmental, sociocultural, personal, and built-environment influences impacted their

ability to achieve a life free of disease. Societal values at the project period were directed toward an emphasis on ease and efficiency, which promote a sedentary lifestyle. For example, the percent of individuals walking to work fell to 2.8% in 2008, down from 4.1% in 1977 (Institute of Medicine [IOM], 2012). Pender et al. (2006) proposed that community-level population interventions provide an effective approach to reverse current patterning toward sedentary behavior and to move toward *Healthy People* PA goals. Population-level intervention was beyond the scope of this project but is noteworthy as a potential additive influence in the background. This project addressed one-on-one individualized care that influences PA engagement and was expected to add incrementally to the health of this group of stakeholders in the longer term.

Barriers Overcome

Provider attitudes and practice barriers discussed in Chapter 1, such as simple provider *inattention* to the use of an array of interventions to alter PA behavior needed to be addressed (Buchholz, Purath, & Rittenmeyer, 2009; Calfas et al., 1996). This project motivated healthcare workers to change practice policy by highlighting the view in the literature that PA assessment should be treated as a *vital sign*. This reminder, coupled with the high-profile attention that PA was receiving as a national and state-wide health priority, promoted provider engagement with the need to integrate PA assessment and intervention into practice. Discussion of the evidence base and showing staff how to offer interventions that successfully move clients to change behavior directly combated staff resistance (Buchholz, et al., 2009; Koehn & Lehman, 2008). The fact that FHC nursing staff had a bachelor's degree at a minimum, made acceptance of evidence-based practice more likely (Koehn & Lehman, 2008).

It was important to anticipate practice concerns for the time burden of evidence-based assessment and intervention (Buchholz, et al., 2009; Koehn & Lehman, 2008). The time it takes to document a PA level on a client is comparably as easy and rapid as obtaining other vital signs. Documentation and analysis of the result of a PA assessment did not significantly prolong the client intake process. Results lend themselves to rapid interpretation for immediate flow into discussion of the implications for the client, which is to say, to begin to intervene when it is indicated. The utility of the telephone intervention is seriously hampered by time considerations, making it impractical for use in many healthcare offices. The Y organization removed this burden on the healthcare team by assuming the responsibility for making telephone calls. Long recognizing the importance of telephone coaching, the Y had trained callers available to contact referred clients.

Y phone counselors were trained to use a coaching modality, and were the first point of contact for referred clients to enroll in programs of interest. Use of the transtheoretical model's stage of change assessment in this call informs the counselor regarding how to approach the particular client. The tactic differs for example, if the client is in the *action stage* versus an earlier stage of behavior change. Perceived barriers revealed in the telephone calls could be alleviated by targeted counsel. Similarly, perceived facilitators such as an initial attendance at an exercise class could be amplified by offering praise. Refusals to participate, if willingly proffered along with an explanation for declining the offer, could inform program evaluation and become part of a communication loop back to the referring healthcare office.

Facilitators Enlisted in the Project

The Y community outreach program sites were conveniently located in the Grand Rapids central neighborhoods, many of which were close to a city bus line for easy access. The Y's partner sites were set up in familiar community settings: churches, schools, housing complexes, and non-profit ministry centers. Hub locations were easy to get to and were in the near southeast and southwest Grand Rapids districts where the target healthcare practice was situated. Programs offered at the sites were without cost to the participants and were set to continue to be free in the near-term. Long-term strategies were being envisioned with consideration for sustainability.

The typical group exercise sessions allowed attendees to move at a speed that matched their preliminary endurance levels and avoided the unpleasant sensation of over-exertion. Moderate-intensity activities and PA that is perceived as *popular* and *enjoyable* and other *gain-framed* messaging may enhance the affective aspects of PA engagement and thereby improve adherence (Latimer et al., 2008). Finding *exercise buddies* who may also live in the same neighborhood offers the possibility of socializing and making outside-of-class connections that cement commitment to the site activities. Mutual encouragement may then operate to improve adherence to lifestyle change. In a review conducted on behalf of the American College of Sports Medicine, Garber et al. (2011) found that exercise adoption and maintenance that is activated via interventions that are theory-based improve short-term adoption and adherence. Y community programs may employ SCT and TTM constructs such as observational and experiential learning, self-regulation, self-efficacy, and helping relationships that should improve participation levels (Redding et al., 2000).

Measurement

PA Level Measurement for this Project

Prior to application of the intervention set, an assessment of PA would establish the baseline measure of each eligible client's habitual level of PA engagement. Self-report (SR) is a prevalent mode of tracking exercise intervention outcomes. Williams et al. (2012) catalogued 104 SR questionnaires that measure PA in the chronically ill and elderly. Their survey points to the large number of SR PA-related questionnaires that exist. Various types of instruments and methodologies are used for SR, with different degrees of specificity. Foster et al. (2005) in their meta-analysis of RCTs of interventions promoting PA, considered a number of options under the SR outcome umbrella: total minutes of PA; proportion of respondents reporting a pre-determined threshold level of PA (such as a guideline recommendation); total energy expenditure per week (estimated in units such as kcal/week); or frequency of participation in various types of exercise over a specified period of time.

A problem for many instruments used to measure PA is that they lack a conceptual framework for defining PA (Gimeno-Santos et al, 2011). MacKay, Schofield and Oliver (2011) believe that for some populations at least, SR may not capture habitual activity associated with performing ordinary household activities such as childcare. Despite some short-comings, SR tools are realistic as an assessment choice for busy practices because of their efficiency and simplicity of use (Reiser & Schlenk, 2009), which likely helps to explain why there are so many of them.

A good candidate SR instrument should have been validated explicitly for use in PC. Smitherman et al. (2007), in their review that was specific to PC settings, included

various measures of PA or physical fitness as outcomes. Among the SR-PA measures was the Seven Day Physical Activity Recall (7DPAR) that has been validated in young adults (Washburn, Jacobsen, Sonko, Hill & Donnelly, 2003). A 3-day PAR has also been tested and found valid in young adults (Han & Dinger, 2009). Either of these could provide a reasonably valid measure of PA outcomes *in young adults* in PC, however, a single instrument that is valid for a wider age-range should be more useful for universal coverage of PC clients.

The IPAQ was developed by the IPAQ group, an international team of PA experts (Craig et al., 2003). It is a self-report measure developed to accomplish rapid PA assessment in older adolescents and adults aged 15 to 69 years (see Appendix A). The IPAQ was designed to rank and quantify client habitual activity level based on recall of the previous seven days. While it is not an ideal measure from the standpoint of validity, it is adequately reliable, and is a better choice for use in PC settings because it is one of the simplest and most rapid means available to determine a PA level.

The IPAQ is immediately retrievable online without cost. The IPAQ-SF forms are available in 21 languages plus regional variations of several languages. It also has versions that are attuned to the situation or need: long-form, short-form, telephone interviewer- or self-administered. Due to the need for rapid PA level determination that does not excessively prolong the course of an office visit, the IPAQ short form was used in this project.

The IPAQ determines a categorical result for habitual activity that is *low*, *moderate*, or *high*. PA category is negatively associated with CVD risk and guides providers regarding the necessity of implementing a PA improvement plan. It also

reveals the types and amount of additional PA needed to make progress toward more active categories. The PA level suggests health implications and appropriate targets for PA improvement. The three-tiered ranking of the IPAQ aligns with what is known about the health benefits of each level. People in the *sedentary/low* activity level have the greatest need for improvement. Those at a *high* PA level are getting the maximum benefit and only require maintenance. Finally, for those individuals at the *moderate* level, additional benefit may be realized by further boosting PA (Garber et al., 2011; USDHHS, 2008b; WHO, 2010) [JP]). Subsequent to the intervention delivery, the anticipated medium-term outcome after project completion was a change in PA behavior. The IPAQ is not appropriate for those who are not able to:

- read and understand the form
- recall their activities for the last seven days prior to their appointment at the FHC
- estimate the intensity of activities based on the descriptions provided
- estimate the duration and frequency of their engagement in various activities
- alter their current PA level due to a known or suspected health condition

Over time, sequential IPAQ PA assessments can show staff and clients if there is a change in PA category or *metabolic equivalent of task*-minutes per week (MET-min/week) which is a continuous measure (see Appendix B for the scoring protocol). A MET compares the energy expenditure of an activity to the energy expenditure of being at rest equal to 3.5ml of oxygen per kilogram of body mass per minute (Ainsworth et al., 2011). For example, 2 METs means an activity requires twice the energy to engage in as it would take to rest quietly. Since an activity is engaged in over time, estimating or measuring the duration of an activity at a given level results in the determination of

MET-minutes. MET-min added up over a week gives MET-min/week. Continuous data in MET-min/week is useful to demonstrate within-category improvement or declension that would otherwise be invisible if only the category were recorded.

IPAQ- Short Form (SF) reliability and validity. An instrument used as the basis for clinical intervention in this project must demonstrate acceptable reliability and validity and remain practical for application in the PC office setting. The validity of the IPAQ has been investigated in adults (Ainsworth et al., 2006; Craig et al., 2003; Dyrstad, Hansen, Holme, & Anderssen, 2013), including cohorts with schizophrenia (Faulkner, Cohn & Remington, 2005), and obesity (Tehard et al., 2005). Studies recruited subjects in the US (Ainsworth et al., 2006), Australia (Brown et al., 2004), Switzerland (Mader, Martin, Schutz, & Marti, 2006), China (Macfarlane, et al., 2006), Sweden (Igelstrom et al., 2013), and transnationally (Craig et al., 2003; Tehard et al., 2005).

Validity was generally found to be *fair* between the IPAQ and other self-report and objective methods (Craig et al., 2003; Macfarlane et al., 2006; Tehard et al., 2005). Craig et al. (2003) tested criterion validity of the IPAQ-SF against an accelerometer and obtained a pooled Spearman's rho of .30. Concurrent validity in the same study compared the IPAQ-LF to the SF and resulted in a pooled rho of .67. Faulkner, Cohn and Remington (2005) assessed criterion validity of the IPAQ-SF against the RT3 brand of accelerometer and obtained a correlation of .37. Macfarlane, et al. (2006) found that the PA log correlated well with the IPAQ-SF-C at the moderate (.68) and vigorous (.72) activity levels, as well as in total health-enhancing PA (.60). Tehard et al. (2005) obtained a *fair* correlation against the Baecke questionnaire of .51 for assessment of total habitual PA, .40, for walking, and .48 for sitting,.

Mader, Martin, Schutz and Marti (2006) found that total PA correlated significantly (.39) when comparing the IPAQ against the MTI accelerometer for walking minutes of activity (.38) and moderate activities including walking (.39). Dyrstad, Hansen, Holme, and Anderssen (2013) compared the IPAQ-SF to accelerometer and obtained correlations between .20 and .46. Finally, Lee, Macfarlane, Lam and Stewart (2011) in their systematic review of validation of the IPAQ-SF found weakly positive correlations (.09 to .39).

Reliability has been examined in many of the same studies that tested validity. Craig et al. (2003) also checked test-retest reliability of the various IPAQ language and form lengths and found that they performed similarly, resulting in a pooled rho of .76. Brown et al. (2004) found 79.4% agreement for classification in one of the IPAQ-SF's three categories on two occasions, about 24 hours apart. Faulkner, Cohn and Remington (2005) obtained a test-retest reliability coefficient of 0.68 for total minutes of PA per week. Mader, Martin, Schutz and Marti (2006) calculated reliability coefficients that ranged between .43 to .60 using continuous data and a kappa value of .32 for an active/inactive dichotomous categorical variable.

In conclusion, certain clients may overestimate their recall of moderate and vigorous activity, while underestimating sedentary time (Igelstrom, Emtner, Lindberg, & Asenlof, 2013). Weak criterion and convergent validity against objective PA measures is a continuing concern that will need further refinement until a better standard for PA measurement that is practical for use in PC is found. Faulkner et al. (2005) concluded that the IPAQ-SF is the most useful surveillance tool for reasons of practical application, reliability, and *some accuracy* in the setting of *actual clinical practice*.

Roll-out of the PA Intervention Set

In their discussion of the means to prevent diabetes type 2, Greaves et al. (2011) advised that with implementation, professionals need to consider how to achieve risk reduction without draining available resources. They delineated intervention components that are most powerfully associated with achieving the desired lifestyle changes.

A policy was written for professional staff members to follow for the assessment of the PA level of eligible adult clients who present for scheduled appointments at the GVSU-FHC, using the IPAQ-SF. Interventions to implement when PA was found to be insufficient were also delineated in the policy. The flow process established by the policy was that the client was to be given the IPAQ-SF to complete as part of the appointment intake procedure. Next, a staff member (usually an RN) then called and escorted the client to an exam room for the appointment where the chief complaint was usually reviewed and vital signs measured. The staff member was to enter the client's IPAQ responses into the IPAQ calculator program. Then the categorical and MET-min/week results obtained from the calculator were to be entered into the designated places in the EHR.

After PA assessment was completed and the level obtained, the RN or NP was then to review, with those clients who were in the low/sedentary or moderate categories, their ability to engage in PA using the 2014 PAR-Q+ or another method they were already familiar with. If there were no health barriers to PA, the clinical staff member could counsel for PA and assess stage of change by asking the client about readiness and plans for PA engagement. Staff members were also to offer EHR-embedded educational

material including the options of a brochure and web resource such as the *Twende Mbio!* link (Sanchez, 2013) for more in-depth PA information.

When clients were eligible and ready to engage in PA improvement, professional staff were to offer referral to Y community outreach exercise programs. The policy also encouraged NPs or RNs to use counsel that was informed by knowledge of the client's health status, known chronic disease, and risks. Guiding benchmarks for the counseling exchange were the client's stage of change and PA category.

As an element of the intervention, sedentary adults who accepted *referral* to Y community programs (see Appendix C) received the assistance of a Y caller who was to help them sign up for a group exercise or other health promotion class. The referral form asked for client permission to allow the Y and the FHC to share information to track participation and other results of the referral. The Y community organizations were dispersed in the inner city so that it was likely to find one near the client's home. The Y outreach programs offered popular activities such as dance-oriented Zumba, or martial arts-like kickboxing to appeal to a variety of people's tastes. The sessions were led by professional instructors who assured a consistent and graded regime that included elements of warm up, cool-down, stretches, and well-timed breaks. Participants benefitted from a barrier-breaking, familiar, safe, close-to-home location, and the camaraderie of family, friends, and neighbors who could participate together (Smith, VanderPloeg, & Buffart, 2008). PA performed with one or more exercise buddies could result in enhanced activity-associated affect, social enrichment, role-modeling, and other SCT and TTM-based theoretical effects that encourage adherence (Elley, Dean & Kerse, 2007).

Pronk (2012) noted that experience from dissemination studies' real-world application of PA interventions showed that "adaptations to the original interventions are a necessity- an inflexible focus on achieving intervention fidelity may in fact limit successful adaptation to the local context" (p. 104). With this advice in mind, feedback on the implementation rollout provided clues to needed changes and adjustments to PC office and Y procedures, and the communication loop between them.

Institutional Review Board

The proposal of this project was approved by the author's dissertation committee. A determination was then made that this project was not research, but rather was quality improvement focused. This determination was made by the dissertation chair and a co-chair of the GVSU Human Research Review Committee. (see Appendix K).

Staff Training in Use of the Intervention Set

The IPAQ-SF was instated as a PA assessment tool for baseline and follow-up measurement of clients. The staff were willing to treat PA assessment as a vital sign and this was expected to foster consistency in its use. An IPAQ-SF calculation tool was created, installed, and fit into workflow processes to reduce staff concern about added time burden related to calculating MET-min/week, and determination of the clients' habitual PA categories. Because a PA category determination based on a tool that gives both a categorical and continuous result was a new refinement to usual practice, the meaning and health consequences of the levels were reviewed in a clinical staff meeting just for the introduction of the IPAQ. Then the intervention set from Chapter 2 was discussed at regular staff meetings with follow-up visits post-implementation to answer questions that arose. At a staff meeting in October, 2014, the final draft of the policy

was presented with opportunity for comment before it was approved and added to the policy manual of the FHC. The intervention strategies were included in the policy for staff reference (see Appendices D, E, F, G).

Project Summary

Specific quality improvement deliverables or outcomes that were designed to facilitate implementation of the policy are:

- A policy was written and approved by the FHC staff outlining the evidence-based application of PA assessment, intervention and documentation for inclusion in their policy manual.
- The IPAQ was accepted by staff as sufficiently reliable and practical and integrated into assessment of clients presenting for well and chronic disease follow-up visits.
- A spreadsheet calculator file was created and installed on office computer desktops to facilitate conversion of client IPAQ responses into a category level and numeric total MET-min/week.
- The calculated values from the IPAQ were given a defined place for documentation in the Vital Signs and Social History sections within the EHR.
- A categorical finding of *none*, *low* or *moderate* PA level on the IPAQ was to trigger implementation of the intervention set consisting of PA education using an EHR-embedded document created and approved for this purpose, counsel directed to improve PA level, and an offer of referral to Y community programs.
- The 2014 PAR-Q+ was referenced in the policy and made available to aid assessment of PA readiness at the discretion of staff.

- Interventions were to be documented in the EHR, as specified by the policy, assisted by templates created to simplify the documentation process.
- A Y referral process backed by a Memorandum of Understanding between the Y and the FHC was created.
- A document was created, outlining the lessons learned through the creation of the referral collaboration with the Y in order to inform potential future collaborations with other clinical settings and to offer ongoing collaboration with other DNP students. This document was to be shared with the Y Director of Community Outreach programs.

As a result of putting these project goals in place, the long-term outcome foreseen by this project was to improve PA levels in adults at risk for developing a number of acute and chronic illnesses and conditions that can be terribly debilitating. Avoiding these conditions altogether, delaying onset, or decreasing severity through participation in regular PA is good for the individual and for the entire healthcare system. PC utilization of a rapid PA assessment tool allows PC staff to intervene with those found to be in the low/sedentary and moderate PA categories and offers the individual hope to stay well. Over time, if habitual PA improves at the population level, the general population will experience a lowered prevalence of chronic diseases that strain our resources.

Figure 2. Diagram of Planned Flow of Assessment and Intervention Process

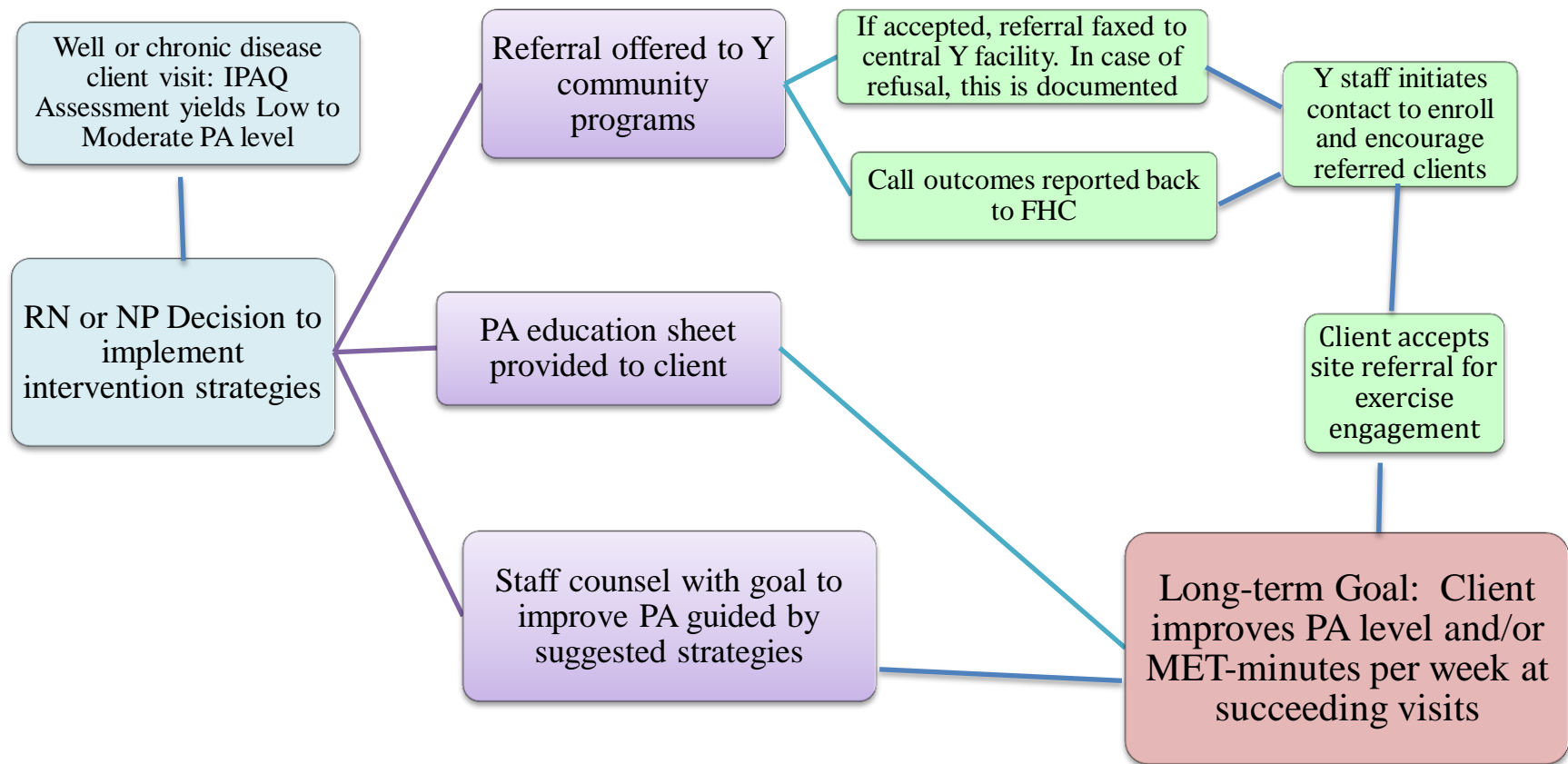


Figure 2. Flow process for the policy-driven assessment and intervention components. The flow is left to right starting with IPAQ PA assessment. PA = physical activity; VS = vital signs; Y = YMCA; FHC = Family Health Center; IPAQ-SF = International Physical Activity Questionnaire, Short Form

CHAPTER 5

PROJECT OUTCOMES

The evidence for the helpful role of adequate PA for delaying or preventing a variety of chronic diseases was discussed with the leadership of the Family Health Center in the year prior to project completion to develop interest in the topic. Implicitly, there was a need to distinguish those PC clients who needed intervention to improve their PA levels from those who did not. The electronic health record in use at the time included a template with broad assessment language regarding PA that was only vaguely quantified. The template was for well visits only and PA questions focused more on *what* clients do for PA, rather than how long, how often, and at what intensity. A survey of the six FHC clinical staff members found that discussion of PA with clients was inconsistent in regard to delivery, intervention and documentation. Three of six staff members thought a review of PA counsel would be helpful. Only two indicated that a theoretical framework was used to guide their discussion of PA with clients.

PA Assessment Tools

The IPAQ-Short Form

The first outcome for this project was the implementation of the IPAQ-SF as an evidence-based tool that enables staff to assess PA and intervene based on standardized values that can be recorded and used as a guide for care and to monitor client progress. The IPAQ, along with rationale for its use, was presented to FHC administration for initial approval, then to staff members at a regular monthly meeting in the summer of 2013. At that time the intention was to have staff members become accustomed to using it as a part of the normal client intake process through the Fall of 2013. The first goal of

the initial meeting was to present evidence that PA assessment is a vital PC activity due to its implications for health. The second goal was to present evidence that the IPAQ-SF represents a practical assessment tool that has reasonable reliability and validity for use in a PC setting. The outcome of this meeting was that staff agreed to use the IPAQ-SF because it allows for a simple, rapid assessment of PA that yields a meaningful categorical level to guide intervention. They could see that tracking PA assessment results over time would allow them to monitor a client's PA status as they do with other vital sign data.

The IPAQ Calculator

A problem was uncovered when a second staff meeting for planning implementation of the IPAQ was held in the Fall of 2013. Their hesitation was with the math involved in calculating METmin/week using the client's responses. The algorithm used to determine the categorical PA level was also difficult to quickly and intuitively master. They believed that calculation would be time-consuming and prone to error without a software program to automate computation using the provided formulas. A calculation tool was needed to facilitate speed and accuracy with the IPAQ.

The first calculation program was developed and written by an information technology student. However, his program had a couple of flaws that came to light which delayed implementation until early 2014. It was found that it was not compatible with all of the variously-aged computer operating systems in use at the time. This defect was patched but risked halting or severely impacting the ease and accuracy of PA assessment if nurses could even be convinced to try to hand-calculate the results. The custom nature of the program also meant that it was vulnerable to incompatibility with

revised or alternate operating systems going forward, and eventually proved fatal when a new EHR platform was rolled out in June of 2014. The rollout of the new EHR was a related problem and is discussed below.

With the help of a statistics graduate student, the author was able to create a spreadsheet file in Microsoft Excel® that computes both the categorical and numeric PA results. Excel software was already resident on most of the office computers, allowing the file to be updated to successively newer versions of Excel as they are installed over time. The calculator was tested using patient-completed IPAQ forms and found to conform to the complex scoring rubric. This new calculator was installed on exam room computers after completion of the new EHR rollout.

The IPAQ Fit, Workflow, and EHR Changeover.

After the IPAQ was accepted by clinical staff and the first calculator was installed on exam room computers, workflow was analyzed with RN and office reception staff. The outcome was to normalize and script PA assessment as a part of patient registration, intake, and rooming.

The IPAQ self-report style assessment replaced provider questioning during face-to-face history-taking by the NP in the exam room. The results were ready for review after the visit intake process and allowed counsel or other usual-care components to ensue immediately. Well and chronic disease visits had the previously mentioned allocation to PA assessment, so replacing previous processes added little to the time burden for NPs. However, it did shift PA assessment documentation to the RN staff members who were sensitive to time constraints.

Results of the initial experience in the former EHR environment during a period of four months were tallied and shared with the RN staff to provide feedback on IPAQ data collection (see Table 2). For this purpose, the basic *at a glance* scoring protocol (see Appendix B) was used and did not involve data cleaning. In clinical practice, individual results are the focus of client assessment and intervention and would not be altered for the sake of integration with a large data set. For feedback on accuracy, forms were considered invalid when they appeared to have an impossible or extremely unusual high PA report such as 20 or more hours of *continuous* PA per day.

Table 2.

IPAQ Data Collection February through May, 2014

	<i>Low</i>	<i>Moderate</i>	<i>High</i>	<i>Invalid</i>	<i>Total IPAQs completed</i>
<i>Patient Count</i>	87	72	94	26	279
<i>Percent</i>	31.2%	25.8%	33.7%	9.3%	100.0%

Staff members were congratulated for the quantity and quality of IPAQ completion during the trial period. A meeting was held at which we reviewed the distribution of results and problem-solved how to reduce the 9.3% proportion of invalid forms. Invalid forms were incomplete or erroneous and therefore unsuitable for recording a result in a client's chart. Targeted, gentle, brief questioning of the client's understanding and intent was suggested as a way to be able to potentially salvage some invalid patient forms. Nurses agreed to check for obvious misunderstanding or clerical errors so they could be corrected. Staff members reported back that some clients had difficulty with the forms but that most were able to comprehend and complete them with

reasonable accuracy. It was also agreed and clarified that clerical staff should not be expected to check for accuracy on the forms.

Progress on the project was disrupted when, after many delays, the FHC received approval to proceed to scrap their previous EHR in favor of a more robust product that better suited their needs. Routine use of the IPAQ was halted when it came time for the FHC to migrate to the new Athena EHR in June, 2014. Restarting IPAQ use had to wait until staff members were comfortable with the new EHR and PA assessment workflow and documentation processes were adapted to the Athena® EHR product. Athena® does not allow subscribers to create new chart fields, so IPAQ results needed to fit within the template structure. *Exercise* assessment is recorded in the *Social History* section of Athena® and is limited to a drop-down list of categorical choices that closely match the IPAQ categories. Documentation of a PA category level in the Social History section required the staff to think of PA as a social concern, while still maintaining urgency as a vital sign.

The IPAQ numeric result was found to fit a data entry point in the *Vital Signs* area of the Athena EHR that acceptably approximates the meaning and numeric range of the IPAQ MET-min/week result. Though the label is not precisely the same, staff members agreed that there would be no confusion if documented there. The MET-min/week values recorded over multiple visits can be analyzed visually via a graphing function embedded in the vital signs area of the EHR. A graph of change was thought to have potential utility for explaining PA progress visually to clients.

The IPAQ assessment tool and calculator yielded actionable data for clinicians. It was also important for staff members to have evidence-based interventions to offer

clients in a confident manner so that they are encouraged to take action to improve their PA level based on these results.

FHC and Y Collaboration

The author was familiar with Y community outreach programs at the time of his immersion in the Y organization in Fall 2013. He became intrigued by the possibility of creating partnerships that would mutually benefit the clients of both the Y and PC practices in the community. The nature of hub site programming was noted to align with the needs for lifestyle modification recommended by nurse practitioners, physicians and others who provide general healthcare to people of the area. The main health domains that the Y seeks to impact are nutrition and exercise. The latter fit well with the intervention portion of this project.

The outcome of meetings and negotiation between the FHC and the Y community outreach program representatives was a proposal to draft a Memorandum of Understanding facilitated by the author. This document outlines a referral process that had been worked out between both organizations, and contains the framework of expectations governing transitions of clients between the two partners. This agreement was reviewed by responsible executives from each organization, then given final approval and signed in January, 2014. Y referral became a normal part of FHC practice for insufficiently active clients.

For the FHC, this agreement opened the door to Y community partnerships with hub sites that are embedded in the same neighborhoods served by the FHC. The Y partner sites are local churches, non-profit agencies, and schools that host Y instructor-led exercise classes and nutrition education in these familiar locales without cost to the

participant. Practitioner and RN staff members have been familiarized, during staff meetings, with Y community site locations, types of settings, programs offered, and value to clients provided by these resources in place in the central neighborhoods of Grand Rapids. Each Y community site had a particular constituency, one or more of which could appeal to, or be familiar to, any particular FHC client. The Y could trade on that familiarity in the hope of helping a client feel welcome to participate in programs that sites offer. The long-term goal was the adoption of a healthy lifestyle that would gradually influence others to do the same, and ultimately result in improved population-level health outcomes.

For the Y, the agreement offered access to FHC providers who are trusted by local community members. A recommendation made by a clinician to the Y, would come from a person the clients had grown to trust with their physical and mental wellbeing. Clinicians also guard the record of their client's wellbeing, contained in their private health information. The Y could gain the trust that the clinical staff has built with clients. Clinical staff members were used to the idea that they refer patients to an outside agency in order to transfer a portion of care to specialists. Clinician confidence is bolstered in Y personnel because they have built a trusted community reputation.

The FHC was not the first health agency to become a partner with the Y, but does qualify as an early adopter and user of a referral mechanism. This project was the first to treat the Y connection in a manner that is familiar to healthcare: as a professional to professional referral. This means that processes are similar to when healthcare providers make referrals to other specialties. This brings a sense of familiarity to the process so

that Y referral is not a special case that requires staff to embrace a unique set of additional procedures.

The referral process was rolled out as soon as the memorandum of understanding was signed in late January. Results indicate that only six to eight referrals were made between late January and June, 2014 to the Y (T. Warfield, personal communication, June 6, 2014). Of those referred, calls by the Y counselor only resulted in one person accepting placement with her assistance. Interview of the FHC's full time adult nurse practitioner before her departure from staff revealed her impressions of offering Y referral to her clients (B. Hartrum, personal communication, March and April, 2014). She found that clients did not appear to be as attracted to participation in the community sites as had been hoped, and therefore declined referral. She too, was dismayed by the lack of interest. Also cited as a reason for low referrals were lower patient numbers after January, 2014 occasioned by policy changes at the beginning of the year. This resulted in the discharge of patients who did not respond to debt collection efforts. Others were discharged because they did not obtain insurance through the exchanges set up as part of the Affordable Care Act. This meant fewer opportunities to refer.

Referral was also likely affected by the coincident departure of the adult nurse practitioner and insertion of a temporary employee around the same time that the EHR changeover occurred. During this same general time-frame the Y champion for the FHC partnership went on an extended leave. A new full time NP did not start at the FHC until September, 2014. When the new EHR rollout occurred in June, staff needed to give their full attention to learning how to use it and navigate between the old and new EHRs to care for clients. Documentation of the IPAQ was stopped until the new EHR was

assessed and new documentation processes were fully developed through a permanent policy. IPAQ use was also curtailed by the need for a new calculator to replace the custom software that was linked to the old EHR.

Due to these impediments attention was given to developing and launching the tools discussed in this chapter: verifying that the Y referral process was still live; writing and establishing the FHC's PA policy and supporting documents including the PARQ+ and ePARmed-X; review of the PA intervention set; and the PA embedded educational and documentation elements. Overall, Y referral numbers did not meet expectations. Referral was re-established when the PA policy became effective in October, 2014, and continued in the hope that increasing stability would result in improved referral numbers. A reassessment of this approach was expected in a future round of continuous improvement.

Intervention Protocol

A search was conducted to find evidence-based practical and effective means for intervening with low PA levels in the PC setting that preceded the author's immersion into the Y organization in Fall 2013. The outcome of the literature search described in Chapter 3 was an evidence-based PC intervention set that was integrated into an overall PA policy for the FHC (see Appendix D). The PA policy addresses how to help adult clients achieve PA recommendations when they are found to be insufficiently active at baseline. Insufficiency was defined as activity levels in the *None*, *Low* or *Moderate* categories based on the evidence for improvements in health outcomes when adults move from lower categories toward the High PA category as discussed in Chapter 3.

Intervention components for insufficiently active adults that were integrated into the FHC's PA policy include: (a) one-on-one counsel of insufficiently active clients regarding PA benefits and guideline recommendations as part of a scheduled visit that results in client-determined goals for action; (b) offer of referral to community PA resources such as the Y community hubs that expose clients to social opportunities that involve PA and have eliminated or reduced common barriers to participation such as cost, lack of role-models, safety, unfamiliar environment, and accessibility; (c) telephone follow-up as a component of Y referral, to ask about progress, assess stage of change, and offer further PA counsel, and; (d) the offer of a PA educational flyer that highlights major points for discussion and application.

PA Counsel

The aim of counsel is to set mutually agreeable client PA improvement goals. The flyer discussed below was created to facilitate the counsel component and was made available to the client electronically or as a paper-copy, per their preference. This is designed to aid recall of the discussion. The policy specified that clients with *High* categorical levels of PA were to be encouraged to continue at that level (see Appendix D, No. 7). The policy included an attached review of the PA intervention set where detailed advice is offered to the provider for how to approach counsel that is based in theory. This review included, for example, concepts from the transtheoretical model and motivational interviewing.

Educational Flyer

An educational sheet or flyer was another project outcome of the intervention protocol described above. It was created to be useful to a wide range of adult clients (see

Appendix F). It was written at a Flesch-Kincaid grade level of 7.2 and was embedded for retrieval in the *Patient Instruction* area of the EHR. The evidence-based teaching documents used to develop the educational guide were from Kravitz (2011), writing for the American College of Sports Medicine, NIH-NHLBI (2011), NIH-NIDDK (2006), and NIH-WIN (2014).

After review by FHC leadership and staff, the approved version of the flyer was referenced in the PA policy. The procedure for its use directed staff to discuss the most pertinent flyer contents with the client during the visit. As part of the patient summary, an electronic copy could be delivered to the patient via an active private web portal for review online from home. A paper-copy could also be printed and delivered to the patient when visit summary is included as part of checkout.

Other Embedded Documentation

Several more documentation options were embedded in the EHR as separate items to facilitate rapid documentation of PA intervention efforts during the visit (see Appendix G). The options included a sentence to document that a client refused educational materials, and another that documented the referral offer outcome. Statements were set up as sentences or phrases that could be checked, or when a short answer was needed, a space was provided to type in client-provided information. These statements could also help to justify the use of the PA counsel charge code.

PA Readiness Assessment

In addition to the educational flyer, another set of evidence based tools evaluated to facilitate patient safety when giving advice to increase PA in a PC setting was the 2014 Physical Activity Readiness Questionnaire plus (2014 PAR-Q+) and the companion

ePARmedX+. The latter is available from the same organization but only in an electronic version. Since an electronic version poses technical problems that could not be resolved for use at the time of the project, the ePARmedX+ was offered as an option for FHC clinician use if they had no other medical clearance guideline that they were comfortable using. This form was also of a self-report design.

The self-assessments were created, validated, and updated by the 2014 PAR-Q+ Collaboration (2014) from earlier versions of these tools. The 2014 PAR-Q+ provided a rapid, self-report form to assess for the potential need for medical clearance before engaging in a program to increase PA levels (see Appendix I). A copy of this tool is available for free use when it is used in its entirety without changes.

A second level of assessment might be needed if a patient was not able to be cleared for PA based on answers to the 2014 PAR-Q+. The ePARmedX+ was designed to take the assessment to a deeper level when there is a health concern uncovered by the 2014 PAR-Q+. When clients completed the last page, follow-up recommendations based on their answers could be printed out so that they can be scanned into the EHR. The PC clinician may use the recommendations to help decide on a course of action.

FHC PA Policy Document

In order to establish how best to meet the needs of the FHC through this project the Assistant Dean for Practice responsible for daily operations of the facility was asked about needed practice outcomes. The most important tangible deliverable requested was a PA assessment, intervention, and documentation policy that codified the tools and flow used to carry out the entire PA procedure (see Appendix D). The policy outlined the FHC PA process involving office and clinical staff from patient arrival through the visit

and final documentation. The policy was drafted and reviewed by clinic leadership until the workflow and responsibilities were addressed, including details of documentation in the new EHR.

Documentation forms the basis for payment mechanisms as well as acting as a tool to record progress in care. It was important that the policy reinforce avenues to enhance income to pay for the effort taken to move clients toward lowered health risk. To that end, an underused PA-related code (V65.41 *Exercise counsel*) was highlighted for inclusion in provider's calculations to justify up-coding a visit whenever it was appropriate to do so, and thereby enhance clinic income.

Summary

The physical activity assessment tool, along with the calculator, and intervention pieces of this project were put in place, guided by a policy that mandated use and described workflow. The referral process was created to set the stage for an ongoing successful collaboration between the Y and the FHC in favor of their clients. Per the logic model, inputs of talented personnel participated in output activities to create or find the necessary evidence-based tools to first assess for the health problem of insufficient PA and assure that clients were physically ready for it. Persuasive interventions of counsel, literature in the form of a paper flyer or electronically embedded webpages, and referral to a trusted community resource could be applied to those who most need the help. Organizational tools included the policy and procedure, a robust EHR that recorded visit transactions and measurements, and a partnership agreement that formalized transitions of care.

CHAPTER 6

DISCUSSION

Chapter 6 will present what has been learned from this project beginning with the problem identification through to creation of tangible deliverables and other outcomes. Limitations in what could be accomplished through this project are acknowledged. Recommendations that advance on the foundation of the outcomes and analyses of the project are offered for consideration. To demonstrate doctoral advanced practice nursing, particular role components were embraced through this project to develop the author's competency level. Evidence for the author's employment of the roles of clinician, leader, advocate, scholar, innovator, and educator is presented. Lastly, the entire project is summarized.

Impact and Lessons Learned

At its inception, this project had identified a problem that is significant to PC. The concern was that PA was known to be associated with numerous chronic diseases and health problems, and yet there was not a corresponding emphasis on assessment and intervention to improve PA at the FHC. A critical opportunity for building PA lifestyle awareness and action into the lives of FHC clients was thought to occur when they are seen by their provider for a chronic disease or well visit. Assessment of PA had been a part of well visits in the FHC, though it was not based on a measure that could facilitate interpretation, intervention, and monitoring of progress. The goal to put the necessary assessment and intervention processes and tools in place was realized.

A key intervention depended on establishing a solid cooperative relationship between the FHC and the Y organization's community outreach leadership. Initially there

was enthusiasm for looking at increased emphasis on healthcare partnerships that was specific to the particular executive in charge. When the initial contact person resigned as the project was taking shape, it took a while for the new leadership to develop enthusiasm for a project idea that was new to them. Problems that are dependent on organizational champions are particularly vulnerable if there is a planned or unplanned personnel change that removes a champion. There is a need to broaden organizational support among key decision-makers early in the process so there is less chance for disruption should there be an unexpected departure. There is no guarantee of success when promoting a project to a new leader but lack of support may be mitigated if there are other advocates in the organization who back the project.

Impact on the Triple Aim

The efforts of this project may be comprehended as a part of the larger worldwide quality improvement movement in healthcare. The Institute for Healthcare Improvement (IHI) is a private, non-profit organization that was established in 1991 when it grew out of a national quality improvement demonstration project of the 1980s (IHI, n.d.a). One of IHI's initiatives was to develop the Triple Aim framework which ambitiously seeks improvement in three domains at once. The Triple Aim refers to the simultaneous pursuit of these three goals: to improve population health and the patient's experience of care while reducing the per capita cost of care (IHI, n.d.b).

Population Health. Effectiveness may be evaluated by examining a project's impact toward advancing the Institute for Healthcare Improvement's (n.d.b) Triple Aim. PA improvement at the population level is beyond the scope of this project. However, in order to move a population's PA toward a healthier level, individual healthcare offices

play a role by impacting their constituencies. One approach is to enact the innovation or practice improvement in one location. Then, through dissemination activities, lessons learned and experience from the implementation can be shared with interested healthcare professionals to consider the application of the project in their settings (Burson, 2014).

A medium- (several years) to long-term (a decade or more) outcome could see the expansion of the Y referral model used in this project adopted by other healthcare agencies and offices in the area and the entire region. The applicability goes beyond PC to specialty practices as well, due to the broad range of conditions helped by improving PA.

Cost Reduction. Cost savings to the healthcare system should be realized through population-level PA engagement. Reduced chronic disease risk is the long term goal of enhanced PA assessment and intervention that results in lifestyle change. Care for chronic disease is expensive, amounting to approximately 75% of annual costs for medical care (CDC, 2013a; Thorpe & Philyaw, 2012). Reduced expenditures and improved worker productivity should be the product of lowered risk for diseases such as diabetes that needs expensive care and results in lost worker productivity (Wolf et al., 2009). Until we are successful at increasing PA broadly, populations will not see the hoped-for results of reduced incidence of chronic disease and episodic care that are a consequence of the complications of chronic problems.

Costs borne by individuals are reduced through free access to Y community exercise sites, providing an immediate benefit that should incentivize participation. As mentioned in the diabetes example above, improved health from PA engagement can impact an individual's finances through improved productivity (Wolf et al., 2009).

Experience of Care. The third arm of the Triple Aim represents where this project had the potential for the most direct and immediate impact. Adopting new PA habits can be safer because advice to increase PA is given in the context of interactions with healthcare providers who have the greatest likelihood of making sure that guidelines are appropriately individualized for a client's health history, current condition, and PA level. Individualized care is accomplished by assessing each client's PA level and intervening based on the results, as opposed to using a blanket approach to PA improvement at an aggregate level. Individuals can select the type, duration, and frequency of PA participation. Clients are encouraged to choose activities that they enjoy in order to enhance adherence (Health Scotland, 2008). PA advancement is well-timed in that assessment is proposed to take place at the majority of visits with a provider. The literature review in Chapter 2 provided evidence for the effectiveness of PA to fulfill its promise for clients who engage in it.

When followed over time, documentation in the EHR should detect reductions in PA involvement as well as progress, so the nature of the interventions can be adjusted to fit the current reality. Efficiency can be gained through EHR support, integration of PA assessment with ordinary care, and by assuring that assessment results in the application of interventions that are known to be acceptable and effective. PA care in this context is a move toward increasing a sense of equitable care because clients who did not have access to exercise facilities due to cost were offered a free alternative.

A Logic Model as an Implementation Tool

A Logic Model was used as a framework for the implementation of evidence for PA assessment and intervention in PC. It was most helpful for generating lists of

resources and activities with a sense of the goals or outcomes in mind. It was helpful to subdivide the outcomes into the short-, medium-, and long-term so that there was less confusion about the range and time-frame for reaching desired outcomes. Outcomes targeted most immediately for the FHC and its clients in the short-term maintained focus when they aligned with outcomes targeted for the long-term, at the aggregate level.

On the short-term side of the outcome section of the model, there was more volatility and revision related to changing circumstances in the FHC and what was feasible in a context of limited resources within a limited time-frame. It was reassuring to see that the long-term goal never changed, even though there was uncertainty about how and when we might get there.

The Health Promotion Model (HPM) and Transtheoretical Model (TTM)

The use of the health promotion and transtheoretical models was most visible in the production of a teaching document and discussion during impromptu conversations and regular staff meetings that promoted the use of the evidence based intervention set (see Appendix C). Staff expressed appreciation for the short reviews and provision of a few pointers based in theory that might provide an opening with clients and direction to discussion of PA.

The HPM provided reminders of the social, psychological, and biological influences on health behavior change. Each of these is a component of an *ecological* approach that shows promise when dealing with complex behavioral problems (Pender et al., 2011, p. 72). When the HPM is coupled with the TTM's stages of change, it provides a sense of *what* to do as well as a sense of *when* to do it. This structure guided production, review, and application of the intervention set. Most of the concepts were

familiar to staff, owing to the enduring usefulness of these theories in the health literature. Assessment of a client's PA level via the IPAQ serves to alert both client and provider to the presence of PA insufficiency, which starts the conversation that leads to detection of the client's stage of change and appropriate intervention.

Theoretical constructs also informed elements of instruction provided in the patient education document. Client's recall of PA they currently can do successfully is used to build incremental accomplishment which will contribute to their recognition of *prior related behavior*. A list of suggested ideas in the educational document attempts to build positive affect during PA sessions and recruit social support.

Policy Implications

An important policy implication at the practice level is this project's assertion that PA merits frequent consideration in PC on the level of a vital sign. To generate this degree of attention, all practices and health systems that are not currently requiring regular PA assessment and intervention need to produce a policy that addresses it in care processes. Treating PA as a vital sign requires that electronic and paper systems accommodate recording an actionable assessment that provides clear implications for intervention. Interventions need to be detailed as part of the expectations delineated in practice PA policy so that actions among staff are consistent.

An important innovation of this project was to propose that the process for Y exercise site referral should be handled in the same way that referrals to outside providers are carried out. The FHC PA policy specified the steps to be taken in this regard. On a broader level, practices and community agencies across the nation need to pursue practice referral agreements as a means to collaborate to improve PA at the aggregate level.

Ethics guidelines prohibit referral to for-profit fitness centers that might offer healthcare providers free memberships or other perks in exchange for referrals. Insurance providers have recognized how foundational PA is to health and the prevention of chronic disease and morbidity and have loosened coverage limits. Subsidized client memberships to either commercial or non-commercial fitness clubs have begun to appear in certain plans (Blue Cross Blue Shield of Michigan, 2013). State or national insurance regulation can specify that such offers are mandated in certain circumstances.

The financial incentive of the federal meaningful use program might make PA assessment and intervention more attractive to PC if it is a part of the practice's meaningful use attainment strategy. Practices need to have all the other required elements in place (e.g., an EHR) in order to take advantage of these payment incentives. Menu choices for reaching the payment requirements do not expressly mention PA activities, so explicit inclusion of PA engagement in meaningful use *Stage 2 Core Measure 12* which addresses preventive care reminders, is needed to improve awareness (Centers for Medicare & Medicaid Services [cms.gov], 2012b).

The effort to increase PA behavior is a social movement which will require broader awareness and attention to foster. This project forged another link in the web of potential collaboration between families, churches, school systems, city-planners, health systems, insurance companies, commercial and non-profit exercise facilities, among others. Practitioners, when acting as advocates, must raise awareness of the effects of policies, or the lack of them, in fostering PA engagement. Linking purposefully to educational materials, slogans, and public relations efforts that are part of state- and

national-level campaigns (the *Michigan 4x4* and national *Let's Move* campaigns) should add to the credibility, visibility, and ultimately the sustainability of PA-oriented efforts.

Sustainability

Sustainability of PA referral partnerships may be helped by commercial insurance carriers who recognize the preventive benefits of PA and contract with PA provider organizations to lower the cost of access to facilities for their members (BC/BS of Michigan, 2013). At the time of the project the Y organization and its partners were absorbing costs associated with their community outreach programming and were doing so through effective partnerships with donors who had given multi-year grants. Increased Y community-site attendance through the referral process with a promise of improved health outcomes may impress donors, who are more likely to continue to fund programming that is in accord with their values (Bauer, 2011).

Revenue streams provide another basis for sustainability. In this project patient visit charges were potentially enhanced through engagement in counsel for lifestyle change. Should a provider desire to counsel at length, visit charges may be based on time rather than assessment and intervention components, if the provider documents the purpose of the counsel and the number of minutes taken for health-related discussions. Capturing reimbursement with the use of the charge code for exercise counseling (V65.41) can be a revenue factor if billing and coding professionals work alongside practitioners to assure documentation of PA interactions and include them in the overall value of the visit.

Y leadership hoped to receive many more referrals as a result of partnership with the FHC. It was expected that the FHC alone would be able to enroll a group of clients to

fill a cohort for the Diabetes Prevention Program that the Y runs in collaboration with the CDC. The Y leadership began to look to forming partnerships with employers when referrals did not materialize from healthcare sites. From their perspective there was not a lot of time to reevaluate and find the reasons for the low number of referrals. They needed the classes filled in order to show their funding sources that they are being effective. Employers have demonstrated a willingness to pay to have their workers involved in wellness programs of proven preventive benefit. If employer sponsorship was obtained, then the community sites could be maintained. Unless the FHC staff could reverse the initial experience of low referral numbers, both the employed and unemployed in the community would be left with fewer locations to join in exercise classes should the Y community sites close.

An EHR-queriable lifestyle intervention created from educational materials embedded in the EHR could have set up the practice to satisfy Stage 2 Meaningful Use Eligible Provider Core Measures 12 and 13 (Centers for Medicare & Medicaid Services, 2012a). These measures address reminders for preventive and follow-up care and the provision of educational resources triggered by results in the patient problem list. The FHC decided that pursuit of meaningful use payments was not going to be practical. There also did not appear to be capability to build an intervention alert into the new EHR based on PA results either, so for the FHC there was no hope for an incentive payment as a means to offset any potential costs of PA assessment. Other facilities pursuing meaningful use objectives had an opportunity to exploit that revenue stream.

Sustainability at the practice level is helped by an EHR that reminds providers of prior plans for action for reassessment at subsequent visits. When documented in the

EHR as part of the plan, as specified in the policy, recall of the plan should occur at subsequent visits and continue to be recalled until addressed, thereby improving the chance that PA will receive ongoing attention. There was no need to impose an additional clerical burden on providers by using an alternative referral process.

Chronic disease follow-up office visits may include elements of PA counseling. Office visits for clients who opt for Y referral may require less counsel because time that would have been taken for extensive diet and PA advice can be provided by Y personnel. Clients who do not agree to referral should be counseled for lifestyle change as part of the usual care of chronic disease.

Limitations

This project was completed in a unique kind of PC site that is nurse-managed and overseen by the GVSU Kirkhof College of Nursing. At the time of this project, the majority of PC practice sites were not nurse-managed, and ownership of a nurse-managed center by a university that does not house a medical center is rare. Nurses are educated to think holistically and about disease prevention as a balance to curative approaches to health. Readers may question the applicability of this innovation to a broader array of practice types. This project should be considered a case study that may provide insight into potential problems and avenues to solve them. Pointing to solutions will help others who seek to create similar partnerships and methods for improving PA care.

Due to time constraints and the changeover in personnel with few providers, a useful comparison to pre-policy status was not possible, especially because only four of the original six staff members remain of those surveyed earlier in the project. To detect enduring change in practice, a survey of staff after introduction of the PA policy would

have been beneficial to detect long-term changes in practice in comparison with earlier, usual practice. Loss or changeover of personnel is particularly problematic with a small group of potential respondents, and for this project created a realistic barrier to further evaluation.

Along with the change in personnel at the clinic, there was also a change of EHR charting systems. The EHR change was an unusual undertaking because of the huge costs associated with equipment, contracts, training, work slow-down, and work created because of the need to archive previous records. Staff members' willingness to continue work on what they viewed as a non-essential practice change during the EHR switch was very low. A halt in project activities in the FHC was requested for an indefinite period of time while the EHR and personnel transitions took place. This stoppage necessitated waiting until staff members were proficient with the new EHR. Comfort and familiarity with the new EHR allowed an adaptation of PA assessment, IPAQ use, and documentation to the new system. The lesson from this episode is that unforeseen changes in personnel and systems, apart from practice innovation, may lead to delays in project implementation. Preserving prior gains is difficult when this happens.

Effectiveness of certain project activities could also have been improved. The wording of the staff survey did not yield the best assessment of current practice (see Appendix H). Questions were too long and complex. When yes/no or short answers were expected, there was often no response. Ideally, the plan for improving PA assessment should have originated with the staff rather than the author. The data from the survey are, in either case, more qualitative than quantitative. These characteristics further limit comparisons to other sites.

The Y referral intervention also did not yield the expected flow of FHC clients into these community programs. Initially, staff members at the FHC were questioned about whether Y referrals were being offered. One NP staff member who saw the majority of adult patients stated that she offered referral and described what was available to build client's enthusiasm. However, she was dismayed to see the offer turned down repeatedly by her most needy clients. No mechanism to track the number of referral offers made during that trial period was created. Since the project, referral offers can be tracked in the new EHR when NPs document their PA interventions. Anecdotally, the staff reported that some referral offers were rejected 'for now'. This response points to a pre-contemplation status on the part of some clients.

In regards to community partnerships, the Y is particularly robust in its national reach and health focus that goes beyond provision of space, equipment and instruction for exercise. Their broad reach may encourage other health centers to seek Y partnerships as well; however, many Y affiliates may not be capable of offering instructor-led exercise sessions at no cost to the general public. In regions where there are no Y affiliates, practices may pursue partnership with other types of organizations that have an interest in promoting PA. Lessons learned in this project may not provide insight on that approach.

Recommendations

Expansion of the Emphasis on PA as a Vital Sign

The idea of treating PA as a vital sign should be one of the key messages propagated in dissemination activities. Inclusion of one of the key measures of PA within the vital signs area of the Athena EHR can reinforce to clinical staff that a measure for PA belongs there. The fact that Athena had placed this measure in the vital signs area

shows that at a broader level, this move to vital sign status for PA has some support in healthcare information systems design.

Referral

Another way this project informs PC practice is the suggestion to process referrals to Y community exercise sites in the same way that office staff handle specialist provider referrals. Once referral is accepted by the client, it can be documented and handed off to ancillary staff to carry out. Reporting mechanisms may retain the modes of routing information that are used for other referrals. Whether by paper or electronic means, exercise referral should be followed up in the same way that a practice currently manages other referrals.

It will be important to gather data regarding reasons why referral to Y resources is refused. Future action on referral to improve engagement will depend on whether clients voice concerns with time, transportation (for even the relatively short distance away a site is likely to be), interest, embarrassment to exercise with others, personal fears of the unknown, or other reasons. A subsequent SOC assessment would detect if there is movement from pre-contemplation after an initial refusal. Progress to contemplation or planning stages may mean simply that the client needed time to consider the idea. Lack of progress would indicate a need to assess why referral was refused and then develop a new or modified intervention based on what is learned.

Use of Rapidly Advancing Technology

Short PA educational videos are now commonly available via the internet. A search conducted on the Bing search engine using the key words *physical activity promotion video* immediately returned numerous freely available, short videos. One

example, which had a message and background music likely to appeal to young adults, was put together by undergraduate Clemson University public health science students. This video included accurate information and advice drawn from standard PA guidelines (Lee, Gray, Bates, & Sharp, 2012).

PC staff could offer clients free, online PA educational media that target various subpopulations in an effective manner with an accurate message. In the project setting, the current placement of computers in exam rooms could allow viewing of educational videos while clients are waiting to be seen. A barrier to these actions may be concern for appropriate use and maintenance of equipment within the clinic setting. Nevertheless, those who have internet access may be offered a pre-screened, attractive compilation of information and weblinks that can be viewed on their own equipment. An example of this is a website created by the author at <http://twendembio.weebly.com/index.html>.

The growth in internet access may enable most clients to call up web materials on their smart phones, or other portable devices, right in the office. Education needs and patient demand could provide justification for practices to consider making WiFi available for patient use while waiting, or at any point in the office visit. Webpages could be reviewed with a staff member so that quality and applicability of information is further ensured. Many clients are already using these resources, so it makes sense to bring browsing activity into the clinical setting where guidance is immediately available.

Using a client's own smartphone or a clinic device, an online-only PA readiness assessment product like the ePARmedX+ could be called up and completed by the client. The results and recommendations page can then be printed within a practice for documentation in the EHR. Such resources are often updated periodically by the

collaborations that create them. When the assessment measure comes directly from the creator's website, and the creator is a reputable authority such as the PARQ+ collaboration, one is fairly assured of using the most up-to-date version of the product.

Partnership with Community Resources to Support PA

In order to make the necessary changes to the social and built environment, government, philanthropic and commercial partnerships need to be forged where common interests align. Alliances between non-governmental organizations attract donations from philanthropists who might wish to benefit a local community. Community organizations that are not directly involved in PA activities are also important. For example, assisting an organization such as a neighborhood association in their crime reduction efforts may make use of public areas and walking for transportation more attractive means for PA engagement.

Advocacy at local and regional governmental levels can impact the provision of space designed for PA at all stages of life. Providers can advocate for the reintroduction of physical education as a necessary part of the curriculum in school districts that have reduced or eliminated the requirement. Children can influence the adults at home through what is taught and role-modeled in school. All of these activities may make the social milieu more amenable to ongoing PC attention to PA as a normal and appreciated part of a healthy life.

Community Site Attendance Data

One benchmark evaluation for the medium-term outcomes identified by this project was Y community site attendance data for the referred individuals. The outcome for those who make exercise class attendance and other PA behavior change a part of

their lifestyle is expected to be detectable as a change in the subsequent IPAQ assessment and other PA-sensitive parameters measured wherever the client receives care.

Attendance data can help gauge the success of immediate and long-term commitment to lifestyle change.

Session attendance may be obtained by self-report when clients return for their next appointments or by telephone follow-up after referral. Another source for the same information is attendance feedback directly from the community sites. Attendance data obtained by self-report can be compared with attendance data obtained from the Y in order to verify accuracy and avoid bias through client over-reporting of their participation. Comparisons can also assist practices to estimate whether self-report of attendance would provide a reliable method to assess the PA engagement of their population in the future.

Reports received from a community exercise site may not capture client attendance at other gyms and health clubs. Nor will attendance data capture self-selected, purposeful improvements, such as use of home exercise equipment, integration of more activity into daily routines, or making use of public parks, playgrounds, tennis courts, hiking trails, and the like. Low-cost or preferred options such as walking in a mall, or around one's neighborhood would also not be accounted for with attendance data from community sites. Client self-report should capture data on all their PA participation, wherever it occurs. Raising overall activity of all types is the ultimate goal of intervention.

Doctor of Nursing Practice (DNP) Role Implementation

An intended outcome of the DNP project is that it should provide opportunities for enactment of advanced practice roles at a doctoral level. For the project reported here, these roles are enumerated in the GVSU Kirkhof College of Nursing DNP Scholarly Inquiry Handbook (2014). The roles are discussed below in relation to the author's role enactment during this project.

Clinician

Questioning of current practice accompanied by improved knowledge of how to gather evidence to provide the basis for practice is one way that clinical acumen surfaces in a DNP-prepared nurse's work (Bellini & Cusson, 2011). This project emerged from knowledge of evidence regarding the role of PA in health, coupled with experience in clinical practice that found that assessment and intervention to improve a client's PA are often lacking and inconsistent. Client-enumerated barriers such as cost of membership in facilities, transportation, and inclement weather in this area of the U.S. did not seem to have a ready solution.

Many working clinicians were not aware of resources that the author's experience with Y community outreach brought to light. Partnership through the familiar process of referral to a strong community PA resource was gained through a combination of leadership and scholarship. Scholarship brought the credibility of clinical evidence to interaction with staff so that buy-in was facilitated. This project also required knowledge of clinic routines and exigencies to better understand staff member reluctance to take on what was perceived as an *additional task* rather than viewing change as a revision of usual care that moves them toward *best practice*.

Bellini and Cusson (2011) prefer the term *practitioner* for the clinician role and found some qualitative evidence in the literature that nurse practitioners with doctoral practice degrees have greater *leadership ability* and *clinical scholarship* than they had when engaged in clinical practice with a Masters degree. Bringing the other roles to bear in a practice setting is what makes a DNP *clinician* different from another who simply follows what is already known and has always been done. Leadership was needed to draw other professionals into the process of creating change bolstered by convincing evidence and advocacy for clients who experience the pain and personal cost of chronic disease.

Leader

The American Association of Colleges of Nursing (AACN, 2006) *Essential #2* delineates most clearly that DNP leadership is applied to organizations and systems. Leadership encompasses systems thinking even when one is not in an executive role and focuses on quality improvement. Talbert and Dennison (2011) describe the role of a *clinical executive* as embodying DNP leadership. They believe leadership includes scholarship and interprofessional collaboration and, these align with AACN *Essential #2*.

The leadership role was employed by making practice improvements at the healthcare systems level when the need moved beyond improving an individual organization. Leadership was accomplished when acting as a liaison between the Y and the FHC organizations. Included was an innovative view that the Y represents a true partner in healthcare rather than being seen as a business or philanthropy without specific expertise to contribute. The nature of the complementary educational qualifications of leaders in the Y organization, such as dietitians and exercise scientists with advanced

degrees, helped build appreciation for shared expertise. The collaboration and mutual concern helped participants look at the whole system with an eye toward promoting change. Collaboration extended to imagining together how healthcare partnership might work regionally and nationally, not just locally. Partners became invested in the knowledge that what worked in this instance could add to what is being learned about these alliances and serve as a pattern for wider application. This aspiration was communicated in an article published in a regional newspaper that described the project goals (Sanchez, 2014).

Advocate

The role of an advocate is expressed in AACN *Essential #5* (2006) and speaks to analyzing, developing, and implementing policies that will improve care. In this project policy was developed from scratch for the FHC because none existed that addressed PA assessment. Collaboration with leadership at the practice site developed the view that PA as a health concern is important enough to merit thorough delineation of expectations to guide staff to implement processes governing regular assessment and intervention. While this level of policy affects only one organization, that policy may now serve as a model for a similar policy in many more PC organizations.

Advocacy in bringing awareness of resources and processes to the attention of the general public was carried out through publication of the aforementioned newspaper article (Sanchez, 2014). In the article, a description of Y resources was provided along with a description of the referral process. Further advocacy is planned during additional dissemination of the completed project. Healthcare professionals will be asked to view

PA assessment as a vital sign and to develop community partnerships with exercise facilities for referral modeled after the FHC collaboration with the Y in this project.

Scholar

Clinical scholarship for the DNP is primarily focused on bringing research to bear on practice (Gonzalez & Esperat, 2011). Scholarship describes the activity involved in bringing about improvement in practice or in a system; early observation to discover concerns; analysis of the problem and potential solutions; synthesis of current knowledge; application of a proposed solution or improvement; and finally, dissemination of what was learned. The AACN (2006) *Essential #3* describes doctoral preparation that involves analysis of current literature and other forms of evidence to define the state of knowledge and apply it to clinical problems, then disseminate the results so that others benefit from what was learned.

An example of the enactment of this role occurred in the search for the best evidence for PC interventions to influence PA behavior. Evidence was sought and analyzed to determine which strategies were best suited to the PC clinical context. Certain means of assessing PA were rejected based on knowledge of the workflow in that environment. For example, instruments for measuring PA that have higher precision were set aside in favor of less precise but easier to use instruments that were, therefore, acceptable to the staff of the FHC. This decision exemplifies where knowledge from the literature was combined with clinical knowledge to propose an acceptable application.

Scholars look to theory to guide improvement projects. In this case as was discussed above, a logic model was used to organize project implementation. The TTM was used to develop advice to the FHC staff on how to counsel insufficiently active

clients. Use of the concepts of stages of change also helped this author understand how to engage the FHC staff in practice change, particularly in the move from contemplation to planning and through to action. The HPM provided concepts to remind staff members of client supports and barriers to make lifestyle changes. Staff members' acceptance of referral as a strategy was aided by understanding how referral could operationalize concepts such as social support, prior related behavior, and cues to action (Pender et al., 2006). Finally, concepts in counseling theory such as MI guided selection of questions suggested for clinical staff use when discussing PA adoption with clients.

Innovator

Neither Chism (2013), nor Dreher and Smith-Glasgow (2011) in their textbooks on role development for the DNP include discussion of a specific role as an innovator. Innovation is an *implied* activity or mind-set in which the student imagines novel solutions when scholarly searches are unable to locate adequate evidence for a course of action. The activity of innovation is expressed in all of the other roles to some degree. A referral partnership between healthcare providers and the Y is an example of innovation in this project.

This project also implemented a viewpoint that PA is a basic health influence that must frequently be taken into consideration in PC. To that end, this project sought to elevate PA assessment to the level of a vital sign so that it is assessed repeatedly and tracked in the lives of clients. Vital sign status brings an expectation that the results of assessment will be addressed when insufficient PA is discovered.

Innovation is required to solve problems revealed in practice when evidence is implemented. In the project reported here, an example of innovation-in-application is the

creation of first one, and then another IPAQ calculator program to overcome the barrier of a complex calculation rubric that needed to fit the practice's clinical computer systems. The creation of this calculator overcame a barrier that completely halted progress.

Educator

In contrast to the innovator role, Chism (2013), and Dreher and Smith-Glasgow (2011) include chapters on an educator function for DNP practice. The AACN *Essentials* (2006) do not describe explicit preparation for an educator role as part of the framework for DNP education. This is perhaps because Wittman-Price, Waite and Woda (2011) refer to a *paradigm shift* in which DNP-prepared educators are being seen as having an acceptable terminal degree for this role. Rapid change has occurred in viewpoints on this issue. These authors promote the DNP-prepared nurse as an educator in the traditional sense, as an instructor of both patients *and* fellow professionals.

Early dissemination activities for this project have addressed education of the public and fellow nursing professionals. In addition to the aforementioned newspaper article, the author also presented a poster at a leadership conference in early 2014. At various stages, introduction of various parts of the project to the FHC also required education of staff in monthly meetings. These included use of the IPAQ for assessment, introduction of the broad approach to PA assessment and intervention within the FHC, and institution of the referral process to the Y. Impromptu problem-solving sessions also took place during which teaching was involved. In the project's final stages, the PA policy, supporting tools, and EHR documentation were presented in a monthly staff meeting. This session finalized the PA referral process for the future to cap the introduction of standardized PA assessment, intervention, and documentation.

Summary

In response to the urgency of the need to reduce the chronic disease burden of modern lifestyles, PA assessment, intervention, and documentation was adopted by a nurse-managed health center as a practice quality improvement. A logic model was used as a framework to organize implementation activities and outcomes. Assessment was facilitated in PC by the IPAQ short-form self-report instrument that had reasonable reliability and validity reported in the literature and is available in multiple languages and formats. A calculator was created in a commonly available software format and installed on exam room computers to permit rapid conversion of client responses on the IPAQ into both numeric and categorical values using rubrics supplied with the instrument. The health center's new EHR included retrievable places in the *vital signs* and *social history* areas to record these results and follow them over time.

Review of the literature led to adoption of an intervention set compatible with PC office workflow that consists of counsel, an educational document, and referral to Y community exercise sites. The TTM and HPM provided theoretical support for the educational flyer and counseling interventions. Referral to Y community exercise sites was an innovation that adopted familiar specialist referral processes already in use. A policy for the health center was written and adopted that documents the flow process for assessment, intervention, and documentation of the interaction. Use of billing code V65.41 directly applies to the client counsel to improve PA and may permit up-coding of the office visit as a financial and sustainability incentive.

Documentation in the new EHR was facilitated by the creation of embedded templates. Evidence-based assessment tools to assure safe PA engagement were made

available to staff members in case they were not comfortable recommending PA augmentation. A memorandum of understanding was created that outlined expectations for Y community site referral processes and communication between the health center and the Y.

Expansion of this implementation into other practices is envisioned through dissemination activities. Major practice disruptions such as staff turnover and adoption of new EHR systems can significantly delay readiness to adopt new processes. The implementation of the project in a nurse-managed center may cause some to question the applicability to other types of practices. However, there are enough similarities between nurse-managed and typical primary care office practice that this should not limit application elsewhere.

Emerging technologies allow for new ways to deliver high quality PA-related health information to clients. In the setting where the project was completed, gathering attendance data and verifying clinical staff engagement with PA assessment and intervention can quantify the results of the implementation of the PA policy and point out areas for continual process improvement. As the project activities are disseminated attention can be directed to the importance of PA as a health vital sign until it is an expectation for regular discussion between PC providers and their clients.

DNP roles were enacted in the form of scholarly efforts to find or create evidence based tools and to write a policy to guide practice regarding PA promotion. Theory was integrated into the formulation of interventions and quality improvement activities. Innovative products (the IPAQ calculator) and thinking (referral) were needed when roadblocks regularly presented themselves. Leadership and skill as an educator expedited

adoption of change that was disruptive to already comfortable processes. Advocacy for elimination or delay of chronic disease and adoption of interprofessional community partnerships as a means to this end drove the project to completion.

Appendix A

International Physical Activity Questionnaire (August 2002) **Short Last 7 Days Self-Administered Format** **For use with Young and Middle-aged Adults (15-69 years)**

The International Physical Activity Questionnaires (IPAQ) comprises a set of 4 questionnaires. Long (5 activity domains asked independently) and short (4 generic items) versions for use by either telephone or self-administered methods are available. The purpose of the questionnaires is to provide common instruments that can be used to obtain internationally comparable data on health-related physical activity.

Background on IPAQ

The development of an international measure for physical activity started in Geneva in 1998 and was followed by extensive reliability and validity testing undertaken across 12 countries (14 sites) during 2000. The final results suggest that these measures have acceptable measurement properties for use in many settings and in different languages, and are suitable for national population-based prevalence studies of participation in physical activity.

Using IPAQ

Use of the IPAQ instruments for monitoring and research purposes is encouraged. It is recommended that no changes be made to the order or wording of the questions as this will affect the psychometric properties of the instruments.

Translation from English and Cultural Adaptation

Translation from English is supported to facilitate worldwide use of IPAQ. Information on the availability of IPAQ in different languages can be obtained at www.ipaq.ki.se. If a new translation is undertaken we highly recommend using the prescribed back translation methods available on the IPAQ website. If possible please consider making your translated version of IPAQ available to others by contributing it to the IPAQ website. Further details on translation and cultural adaptation can be downloaded from the website.

Data Entry and Coding

Attached to the response categories for each question are suggested variable names and valid ranges to assist in data management and interviewer training. We recommend that the actual response provided by each respondent is recorded. For example, “120 minutes” is recorded in the minutes response space. “Two hours” should be recorded as “2” in the hours column. A response of “one and a half hours” should be recorded as either “1” in hour column and “30” in minutes column.

Further Developments of IPAQ

International collaboration on IPAQ is on-going and an *International Physical Activity Prevalence Study* is in progress. For further information see the IPAQ website.

More Information

More detailed information on the IPAQ process and the research methods used in the development of IPAQ instruments is available at www.ipaq.ki.se and Booth, M. L. (2000). Assessment of physical activity: An international perspective. *Research Quarterly for Exercise and Sport*, 71 (2): s114-20. Other scientific publications and presentations on the use of IPAQ are summarized on the website.

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think *only* about those physical activities that you did for at least 10 minutes at a time.

1. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling?

_____ **days per week**

No vigorous physical activities **➔** *Skip to question 3*

2. How much time did you usually spend doing **vigorous** physical activities on one of those days?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

Think about all the **moderate** activities that you did in the **last 7 days**. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think *only* about those physical activities that you did for at least 10 minutes at a time.

3. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

_____ **days per week**

No moderate physical activities **➔** *Skip to question 5*

4. How much time did you usually spend doing **moderate** physical activities on one of those days?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

Think about the time you spent **walking** in the **last 7 days**. This includes at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure.

5. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time?

_____ **days per week**

No walking → *Skip to question 7*

6. How much time did you usually spend **walking** on one of those days?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

The last question is about the time you spent **sitting** on weekdays during the **last 7 days**. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

7. During the **last 7 days**, how much time did you spend **sitting** on a **week day**?

_____ **hours per day**

_____ **minutes per day**

Don't know/Not sure

This is the end of the questionnaire, thank you for participating.

Appendix B

At A Glance: IPAQ Scoring Protocol (Short Forms)

Continuous Score

Expressed as MET-min per week: MET level x minutes of activity/day x days per week

MET levels	<i>Sample Calculation</i>
Walking = 3.3 METs	MET-minutes/week for 30 min/day, 5 days $3.3 * 30 * 5 = 495$ MET-minutes/week
Moderate Intensity = 4.0 METs	$4.0 * 30 * 5 = 600$ MET-minutes/week
Vigorous Intensity = 8.0 METs	$8.0 * 30 * 5 = 1,200$ MET-minutes/week
	<hr/> TOTAL = 2,295 MET-minutes/week

Total MET-minutes/week = Walk (METs*min*days) + Mod (METs*min*days) + Vig (METs*min*days)

Categorical Score- three levels of physical activity are proposed

1. Low

- No activity is reported OR
- Some activity is reported but not enough to meet Categories 2 or 3.

2. Moderate

Either of the following 3 criteria

- 3 or more days of vigorous activity of at least 20 minutes per day **OR**
- 5 or more days of moderate-intensity activity and/or walking of at least 30 minutes per day **OR**
- 5 or more days of any combination of walking, moderate-intensity or vigorous-intensity activities achieving a minimum of at least 600 MET-minutes/week.

3. High

Any one of the following 2 criteria

- Vigorous-intensity activity on at least 3 days and accumulating at least 1500 MET-minutes/week **OR**
- 7 or more days of any combination of walking, moderate- or vigorous-intensity activities accumulating at least 3000 MET-minutes/week

Please review the full document “Guidelines for the data processing and analysis of the International Physical Activity Questionnaire” for more detailed description of IPAQ analysis and recommendations for data cleaning and processing [www.ipaq.ki.se].

Appendix C

YMCA Referral Form

(Y logo here)
**LET'S WORK
TOGETHER**

**FOR YOUTH DEVELOPMENT®
FOR HEALTHY LIVING
FOR SOCIAL RESPONSIBILITY**

The YMCA of Greater Grand Rapids offers numerous healthy living programs which are offered at various community locations.

Please contact my client to share additional information about the following YMCA healthy living program:

- Community Based Group Fitness
- Cooking/Nutrition Education Classes
- YMCA Diabetes Prevention Program

Name of Care Provider (Print)

Office Name

Signature of Care Provider

Date

The following information should be completed by the client:

First and Last Name:

(Print)

Phone number where I can be reached: _____

Preferred language for communication: (please check one)

- English
- Spanish

My signature, gives permission to allow the YMCA to contact me and to share information about my attendance and any pertinent health and progress information with the Care Provider listed above.

Signature

Date

Office Use Only

Patient did not reply to calls or voicemails:

Number of phone call attempts _____

Patient registered / participated _____

Program Name: _____

Patient declined participation _____

Other:

_____ -

Appendix D

PA Policy for the Family Health Center

Grand Valley State University

Kirkhof College of Nursing
Family Health Center
72 Sheldon Blvd SE
Grand Rapids, Michigan 49503

Policy & Procedure Manual

Topic: Physical Activity (PA) Assessment

Effective Date: 10/08/2014

Authorization: Assistant Dean for Practice

Draft: 10/01/2014

Final: 10/03/2014

Revision(s):

Employee Accountability: Clinical Staff

Whereas **physical activity (PA)** shows strong evidence of a positive effect on health status and risk reduction across a broad spectrum of problems such as cardiovascular disease, diabetes, osteoporosis, falls, depression, and pain control, regular assessment will help detect deficiencies and alert the NP and RN to the need for intervention. An array of intervention strategies are available to the NP and RN for individualized application.

Purpose: To encourage regular assessment of client PA levels and intervention to improve PA engagement, as indicated, so that the preventive and functional health benefits of PA are realized.

1. All patients age 15 through 69 who present for a well or chronic disease visit will be offered the IPAQ short form, self report, in paper format, to complete. The IPAQ is offered to clients by the front desk personnel as part of patient intake. Any questions that are not obviously answerable should be referred to the RN. If the patient refuses or is unable to complete the IPAQ, the RN will ask the patient about their concerns when they are roomed. If the patient still refuses to complete the IPAQ after an attempt to explain its purpose, then the RN will document the patient refusal in the visit note *Social History: Exercise: Comment* box.

2. The office worker will place the IPAQ with other paper documents for RN review at the time the patient is roomed.
3. The RN will look over the completed IPAQ at the time of rooming for coherence, completeness, and to clarify client concerns. Client responses from the completed IPAQ are entered into the provided calculator (found on the computer desktop as an Excel file icon), to obtain the *MET-minutes per week* and the PA *Categorical* result.
4. The RN will enter the PA category level result in the Athena ***Social History: Exercise*** area and the MET-minute/wk numeric results in the Athena ***Vital Signs (VS)*** area under ***Activity Monitor Average Calories Burned***.
5. The RN or NP will verify that the patient is able to engage in physical activity¹ **THE PATIENT WILL NEED TO BE CHECKED BY A PROVIDER IF THEY HAVE:**
 - presence of left arm, shoulder, chest, neck pain or pressure with exertion,
 - bone or joint problems that limit certain movements,
 - loss of consciousness, dizziness has been occurring,
 - can't catch breath after even limited PA,
 - on medication for a heart condition or HTN,
 - known heart or other condition for which supervision has been recommended during PA,
 - pregnant and not yet given clearance for PA,

If the RN is unsure about PA clearance, defer to the NP. It is generally safe to encourage the patient to do more of what they already are able to do. If needed, a PA safety assessment tool is embedded in the Athena EHR and may also be found at: <http://eparmedx.com/wp-content/uploads/2013/03/PARQPlusJan2014.pdf> for the PAR-Q+ (2014)².

6. The clinical staff will encourage advancement of the client's PA level if it is found to be NONE, LOW or MODERATE. The current set of interventions available are **a)** to offer the embedded ***PA Education*** sheet (See attached document.) as a take-along, **b)** to counsel the patient to increase his/her PA levels [see #10 below re: billing code use], **c)** refer to free or low-cost community PA resources via the YMCA. A one-page review with an outline of a suggested counseling approach is attached. See ***Review of the Composite PA Intervention Set***.
7. Clients with an IPAQ result that is in the HIGH category should be congratulated and encouraged to maintain a HIGH level of PA.
8. The RNs will indicate any intervention(s) they provide by noting them in the *Comments/Notes* area next to the Social History PA categorical assessment. A brief statement will suffice such as "*Discussed strategies to increase PA, embedded document given, Y referral accepted and faxed.*" YMCA community site referral makes use of a signed and faxed permission form that is processed in the same manner as other referrals. (See Referral Process policy).

9. The RN will hand off the roomed patient to the NP per current practice using either verbal or written communication that notes the PA level and any interventions already provided to the patient. If the RN was unable to provide PA intervention for a client, the NP has a second opportunity to intervene during the office visit.

10. Interventions that are delivered are documented by the NP, who will note the PA level and indicate the applied interventions (*PA Education*, counsel, and referral) in the Plan of Care under *Goals, Patient Instruction and Discussion Notes*. This plan of care will provide a basis for evaluation and intervention at subsequent visits to help advance a client's PA level. Whenever applicable, the NP will make use of the **V65.41 Exercise Counsel** billable diagnosis code (in ICD-9 which will become Z71.89 in ICD-10) when accompanied by another principle diagnosis for the visit.³

11. Similar to other vital signs (e.g. blood pressure) and health indicators, PA level should be assessed using the IPAQ at subsequent well or chronic disease visits to detect trends and ongoing need for intervention and encouragement. The numeric and categorical results should be entered each time as described in #4 above. Sequential visit MET-min/wk results can then be trended as are other VS. Use of the available graphing capacity of Athena for the VS section as a teaching and monitoring tool is encouraged.

12. The embedded PA educational document will be reviewed regularly so that it is up to date. This is the responsibility of the CQI committee.

References

1. The president's challenge: Adult Fitness Test. (2014). Retrieved from: <http://www.adultfitnesstest.org/riskQuestionnaire.aspx>
2. ePARmed-X+ Online. (2013). Print versions of PAR-Q+ and Q-AAP+. Retrieved from: http://eparmedx.com/?page_id=79
3. ICD-9 data.com. (2014). 2014 ICD-9-CM diagnosis code V65.41. Retrieved from: <http://www.icd9data.com/2014/Volume1/V01-V91/V60-V69/V65/V65.41.htm>

Review of the Composite PA Intervention Set

Based on current evidence the following interventions are suggested for clients found to be in the IPAQ *Low/Sedentary or Moderate* categories.

1. Counsel by a member of the clinical staff. This is a suggested discussion guide.

Assess stage of change (SOC) from the Trans-Theoretical Model using questions to elicit change talk such as: "On a 1 to 10 scale for starting a plan for physical activity, where are you? Why are you at _ and not at zero? What would **you** have to do to move from ___ up to ___? When will you start the change?" Evaluate response to ascertain the SOC the client is in.

Make use of Motivational Interviewing (MI) principles suggested by Dart (2011), e.g., ask the client to propose solutions rather than offering them. Miller and Rollnick (2002) suggest questions such as: "What do you think you can do to increase your activity level? What are some good things that would happen if you increase your activity level? What kinds of physical activity or sports have you played before?"

Pre-contemplation: not thinking about change seriously, at least not in the next 6 mo. May have growing awareness of the importance of PA. Give information about importance of PA to maintain health and avoid disease. Explore benefits (improved energy, decreased risk of DM, CVD, HTN, CA, Osteoporosis, improved mood, lowered depression) and barriers. Why change is important is a discussion point. Decisional balance at this stage is even, or against change.

Contemplation: starting to think change is needed and plans to change in the next 6 months, but not < 30 days. Ideas for how to change are important. Explore benefits and barriers around specific methods of change. Decisional balance is beginning to tip in favor of change at this stage. Why change is reinforced along with beginning discussion of *How, What, Where, When, Who.*

Planning/Preparation: change is decided upon and is expected to begin within 30 days. May benefit from specific planning: *What* to do, *How* to do it, *Where* to do it, *When* to do it, *Who* could help. Problem-solve. Why change is no longer as important because decisional balance has tipped in favor of change.

Action: change is happening for 6 months. Celebrate. Problem solve. Anticipate difficulties and be ready for them with strategies to reduce discouragement (try to lower pain, embarrassment, temptation, and add reward, etc.). Encourage continuance by having client track progress and any milestones ("30 minutes of walking!!")

Maintenance: Begins after 6 months of Action. Celebrate. Analyze situations that pose a relapse hazard and chart a course for avoidance. Recall anticipated benefits.

2. Offer PA education: available in the current EHR based on information from the American College of Sports Medicine (ACSM), and other reliable PA websites.

3. Refer patients to Y community programs: Use the referral form and ask patients to sign giving permission to share information. Fax the form to the Y and retain original to process as other referrals.

Electronic Health Record-Embedded PA Education

Why Physical Activity (PA) is Needed and How to Get Started

Have you heard of the link between not being active and disease? It has been found that a low activity level adds to risk for some cancers, heart attacks, stroke, high blood pressure, diabetes, depression, bones that break easily, and joint and muscle pain. The risk of not being active is important to understand. If you exercise at the right level but still do a lot of sitting, you may still die sooner, on average, than others who sit very little. When you sit too much, more fat stays in your blood instead of finding a place to be used or stored. Movement and standing can help you live longer!

Becoming more active starts with a basic change: Do less sitting and more moving around. When you do a lot of sitting and very little movement, the way you live is considered SEDENTARY. Doing a lot of sitting, even if it's in-between hard, active, work or play, can do harm to your health. Activity that you do every day is more helpful to keep a body healthy than doing short bouts of hard activity every couple of days. So the key is to be active every day. Avoid sitting or lying down for more than a short rest or task.

How much activity is enough?

The *American College of Sports Medicine* recommends that healthy adults do at least **30 minutes** of activity **5 days** a week. Activity that is hard enough to make you sweat, but still able to talk is considered MODERATE exercise. As an alternative, you may do **20 minutes** of harder (vigorous) activities **3 days** each week. If you cannot talk to someone while doing an activity, then that activity is considered VIGOROUS. You may combine both moderate and vigorous levels of exercise during the week.

It is also important to include STRENGTHENING activities. This is when you lift, carry, pull, or push weights or heavy objects. This may be a part of your work or home-life if an activity challenges your muscles. Strength training is moderate exercise. Include it 2 or 3 days a week, with 1 day of rest in-between.

To stay safe: Stop exercising and talk to your healthcare provider if you experience chest discomfort or pain, dizziness, headache, or other problems.

Move at your own pace as you enjoy these ideas to break the sedentary habit:

1. Start at a pace you are able to maintain. Build up to 30 to 60 minutes a day.
2. Wear comfortable shoes and clothing that fit the activity.
3. Track activity using a pedometer, notebook, or phone app to help you see your progress.
4. Set up your work area in a way that allows you to stand and work for at least part of the time that you would usually sit.
5. Walk faster when doing routine walking during the day to get from place to place.

6. Pick up an active hobby such as walking, cycling, jogging, snowshoeing, skiing, tennis, racquetball, swimming, or hiking.
7. During bad weather, walk in the mall, up and down the aisles of a grocery store, or other indoor places that you visit.
8. Stand and walk around while talking on the phone.
9. Play active games with your children or grandchildren. Mow the lawn and do yard work.
10. Take stairs instead of elevators. Park far away from entrances to places you visit.
11. Walk during coffee breaks, lunch breaks and other pauses in your work, especially if the work involves sitting.
12. Bring along co-workers, family or friends to keep you company when you're active. This will encourage others to live healthier.

A word about weight in relation to activity:

If Calories eaten = Calories used = Weight stays the same.

If Calories eaten are less than Calories used = Weight loss.

If you Increase Activity = more Calories used.

References used to prepare this document and helpful online sources and printable brochures:

Physical Activity Guidelines from the US government. Retrieved from

<http://www.health.gov/paguidelines/guidelines/summary.aspx>

American College of Sports Medicine advice on reducing sitting and other sedentary behaviors.

Retrieved from <http://www.acsm.org/docs/brochures/reducing-sedentary-behaviors-sitting-less-and-moving-more.pdf>

National Institutes of Health (NIH). (2006). *Physical activity and weight control*. Publication No. 03-4031.

My Bright Future which advises on physical activity approaches for women at

<http://www.hrsa.gov/womenshealth/wellness/mybrightfutureadulttool.pdf>

Super Tracker to help track progress with physical activity at

<https://www.supertracker.usda.gov/physicalactivitytracker.aspx>

American Heart Association on walking at <http://www.startwalkingnow.org/home.jsp>

Walking... A step in the right direction. NIH publication No. 07-4155. Available in English and

Spanish at <http://win.niddk.nih.gov/publications/walking.htm>

Healthy eating and physical activity across your lifespan: Better health and you. NIH publication No.

08-4992. This is a large color brochure with more help and ideas at

<http://win.niddk.nih.gov/publications/PDFs/tipsforadults804bw.pdf>

Active at any size. NIH publication No. 00-4352. Available at

<http://win.niddk.nih.gov/Publications/active.htm>

Appendix G

Additional Embedded Documentation

NOT Willing- PA Ed

___ The patient is *not* willing to accept education materials for PA improvement at this time.

Y Referral Outcome

___ Referred to YMCA community-based programming, OR, ___ Already participates, OR, ___ Will pursue participation in another community exercise facility. If so, which one?

If referral was declined, is the patient willing to consider referral in the future? _____

Appendix H

Questionnaire Regarding Usual PA Practice

Short Questionnaire About Usual Practice in Regard to Physical Activity (PA):

1. Do you engage clients in discussion of their physical activity level?
(If you answer No, then skip to question 2)

If so, about what percent of your client visits include PA discussions?

Do you provide clients with literature or web-based information about the importance of PA?

If so, about what percentage of your client visits include written or online PA information?

And, please reference the source or name of the lit/websites that you use:

When you do counsel about PA behavior change, do you document this discussion?

If so, how and where in the record?

When counseling patients do you do so with one or more particular theoretical frameworks in mind that you find helpful?

If so, which framework . theory, or model?

2. Would you find a *quick* review of a theoretically-based approach to brief counseling for behavior change helpful, especially if it offered a few key principles and suggestions for how to assess readiness and engage the client?

Or are you satisfied with the methods you currently employ?

3. Do you refer clients to non-healthcare community based resources?

Are you open to doing so in the future?

If not, what do you see as barriers to referral to community resources?

4. If you know of any high quality, free/low-cost PA teaching documents, please suggest them here:

Appendix I

The 2014 PAR-Q+


2014 PAR-Q+



The Physical Activity Readiness Questionnaire for Everyone


The health benefits of regular physical activity are clear; more people should engage in physical activity every day of the week. Participating in physical activity is very safe for MOST people. This questionnaire will tell you whether it is necessary for you to seek further advice from your doctor OR a qualified exercise professional before becoming more physically active.


GENERAL HEALTH QUESTIONS




Please read the 7 questions below carefully and answer each one honestly: check YES or NO.	YES	NO
1) Has your doctor ever said that you have a heart condition <input type="checkbox"/> OR high blood pressure <input type="checkbox"/> ?	<input type="checkbox"/>	<input type="checkbox"/>
2) Do you feel pain in your chest at rest, during your daily activities of living, OR when you do physical activity?	<input type="checkbox"/>	<input type="checkbox"/>
3) Do you lose balance because of dizziness OR have you lost consciousness in the last 12 months? Please answer NO if your dizziness was associated with over-breathing (including during vigorous exercise).	<input type="checkbox"/>	<input type="checkbox"/>
4) Have you ever been diagnosed with another chronic medical condition (other than heart disease or high blood pressure)? PLEASE LIST CONDITION(S) HERE: _____	<input type="checkbox"/>	<input type="checkbox"/>
5) Are you currently taking prescribed medications for a chronic medical condition? PLEASE LIST CONDITION(S) AND MEDICATIONS HERE: _____	<input type="checkbox"/>	<input type="checkbox"/>
6) Do you currently have (or have had within the past 12 months) a bone, joint, or soft tissue (muscle, ligament, or tendon) problem that could be made worse by becoming more physically active? Please answer NO if you had a problem in the past, but it does not limit your current ability to be physically active. PLEASE LIST CONDITION(S) HERE: _____	<input type="checkbox"/>	<input type="checkbox"/>
7) Has your doctor ever said that you should only do medically supervised physical activity?	<input type="checkbox"/>	<input type="checkbox"/>

 **If you answered NO to all of the questions above, you are cleared for physical activity. Go to Page 4 to sign the PARTICIPANT DECLARATION. You do not need to complete Pages 2 and 3.**

-  Start becoming much more physically active – start slowly and build up gradually.
-  Follow International Physical Activity Guidelines for your age (www.who.int/dietphysicalactivity/en/).
-  You may take part in a health and fitness appraisal.
-  If you are over the age of 45 yr and NOT accustomed to regular vigorous to maximal effort exercise, consult a qualified exercise professional before engaging in this intensity of exercise.
-  If you have any further questions, contact a qualified exercise professional.

 **If you answered YES to one or more of the questions above, COMPLETE PAGES 2 AND 3.**

 **Delay becoming more active if:**

-  You have a temporary illness such as a cold or fever; it is best to wait until you feel better.
-  You are pregnant - talk to your health care practitioner, your physician, a qualified exercise professional, and/or complete the ePARmed-X+ at www.eparmedx.com before becoming more physically active.
-  Your health changes - answer the questions on Pages 2 and 3 of this document and/or talk to your doctor or a qualified exercise professional before continuing with any physical activity program.



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2014 PAR-Q+

FOLLOW-UP QUESTIONS ABOUT YOUR MEDICAL CONDITION(S)

1.	Do you have Arthritis, Osteoporosis, or Back Problems? If the above condition(s) is/are present, answer questions 1a-1c	If NO <input type="checkbox"/> go to question 2
1a.	Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? (Answer NO if you are not currently taking medications or other treatments)	YES <input type="checkbox"/> NO <input type="checkbox"/>
1b.	Do you have joint problems causing pain, a recent fracture or fracture caused by osteoporosis or cancer, displaced vertebra (e.g., spondylolisthesis), and/or spondylolysis/pars defect (a crack in the bony ring on the back of the spinal column)?	YES <input type="checkbox"/> NO <input type="checkbox"/>
1c.	Have you had steroid injections or taken steroid tablets regularly for more than 3 months?	YES <input type="checkbox"/> NO <input type="checkbox"/>
2.	Do you have Cancer of any kind? If the above condition(s) is/are present, answer questions 2a-2b	If NO <input type="checkbox"/> go to question 3
2a.	Does your cancer diagnosis include any of the following types: lung/bronchogenic, multiple myeloma (cancer of plasma cells), head, and neck?	YES <input type="checkbox"/> NO <input type="checkbox"/>
2b.	Are you currently receiving cancer therapy (such as chemotherapy or radiotherapy)?	YES <input type="checkbox"/> NO <input type="checkbox"/>
3.	Do you have a Heart or Cardiovascular Condition? This includes Coronary Artery Disease, Heart Failure, Diagnosed Abnormality of Heart Rhythm If the above condition(s) is/are present, answer questions 3a-3d	If NO <input type="checkbox"/> go to question 4
3a.	Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? (Answer NO if you are not currently taking medications or other treatments)	YES <input type="checkbox"/> NO <input type="checkbox"/>
3b.	Do you have an irregular heart beat that requires medical management? (e.g., atrial fibrillation, premature ventricular contraction)	YES <input type="checkbox"/> NO <input type="checkbox"/>
3c.	Do you have chronic heart failure?	YES <input type="checkbox"/> NO <input type="checkbox"/>
3d.	Do you have diagnosed coronary artery (cardiovascular) disease and have not participated in regular physical activity in the last 2 months?	YES <input type="checkbox"/> NO <input type="checkbox"/>
4.	Do you have High Blood Pressure? If the above condition(s) is/are present, answer questions 4a-4b	If NO <input type="checkbox"/> go to question 5
4a.	Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? (Answer NO if you are not currently taking medications or other treatments)	YES <input type="checkbox"/> NO <input type="checkbox"/>
4b.	Do you have a resting blood pressure equal to or greater than 160/90 mmHg with or without medication? (Answer YES if you do not know your resting blood pressure)	YES <input type="checkbox"/> NO <input type="checkbox"/>
5.	Do you have any Metabolic Conditions? This includes Type 1 Diabetes, Type 2 Diabetes, Pre-Diabetes If the above condition(s) is/are present, answer questions 5a-5e	If NO <input type="checkbox"/> go to question 6
5a.	Do you often have difficulty controlling your blood sugar levels with foods, medications, or other physician-prescribed therapies?	YES <input type="checkbox"/> NO <input type="checkbox"/>
5b.	Do you often suffer from signs and symptoms of low blood sugar (hypoglycemia) following exercise and/or during activities of daily living? Signs of hypoglycemia may include shakiness, nervousness, unusual irritability, abnormal sweating, dizziness or light-headedness, mental confusion, difficulty speaking, weakness, or sleepiness.	YES <input type="checkbox"/> NO <input type="checkbox"/>
5c.	Do you have any signs or symptoms of diabetes complications such as heart or vascular disease and/or complications affecting your eyes, kidneys, OR the sensation in your toes and feet?	YES <input type="checkbox"/> NO <input type="checkbox"/>
5d.	Do you have other metabolic conditions (such as current pregnancy-related diabetes, chronic kidney disease, or liver problems)?	YES <input type="checkbox"/> NO <input type="checkbox"/>
5e.	Are you planning to engage in what for you is unusually high (or vigorous) intensity exercise in the near future?	YES <input type="checkbox"/> NO <input type="checkbox"/>



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2014 PAR-Q+

6. Do you have any Mental Health Problems or Learning Difficulties? *This includes Alzheimer's, Dementia, Depression, Anxiety Disorder, Eating Disorder, Psychotic Disorder, Intellectual Disability, Down Syndrome*
If the above condition(s) is/are present, answer questions 6a-6b if **NO** go to question 7
- 6a. Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? **YES** **NO**
(Answer NO if you are not currently taking medications or other treatments)
- 6b. Do you **ALSO** have back problems affecting nerves or muscles? **YES** **NO**
-
7. Do you have a Respiratory Disease? *This includes Chronic Obstructive Pulmonary Disease, Asthma, Pulmonary High Blood Pressure*
If the above condition(s) is/are present, answer questions 7a-7d if **NO** go to question 8
- 7a. Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? **YES** **NO**
(Answer NO if you are not currently taking medications or other treatments)
- 7b. Has your doctor ever said your blood oxygen level is low at rest or during exercise and/or that you require supplemental oxygen therapy? **YES** **NO**
- 7c. If asthmatic, do you currently have symptoms of chest tightness, wheezing, laboured breathing, consistent cough (more than 2 days/week), or have you used your rescue medication more than twice in the last week? **YES** **NO**
- 7d. Has your doctor ever said you have high blood pressure in the blood vessels of your lungs? **YES** **NO**
-
8. Do you have a Spinal Cord Injury? *This includes Tetraplegia and Paraplegia*
If the above condition(s) is/are present, answer questions 8a-8c if **NO** go to question 9
- 8a. Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? **YES** **NO**
(Answer NO if you are not currently taking medications or other treatments)
- 8b. Do you commonly exhibit low resting blood pressure significant enough to cause dizziness, light-headedness, and/or fainting? **YES** **NO**
- 8c. Has your physician indicated that you exhibit sudden bouts of high blood pressure (known as Autonomic Dysreflexia)? **YES** **NO**
-
9. Have you had a Stroke? *This includes Transient Ischemic Attack (TIA) or Cerebrovascular Event*
If the above condition(s) is/are present, answer questions 9a-9c if **NO** go to question 10
- 9a. Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? **YES** **NO**
(Answer NO if you are not currently taking medications or other treatments)
- 9b. Do you have any impairment in walking or mobility? **YES** **NO**
- 9c. Have you experienced a stroke or impairment in nerves or muscles in the past 6 months? **YES** **NO**
-
10. Do you have any other medical condition not listed above or do you have two or more medical conditions?
If you have other medical conditions, answer questions 10a-10c if **NO** read the Page 4 recommendations
- 10a. Have you experienced a blackout, fainted, or lost consciousness as a result of a head injury within the last 12 months OR have you had a diagnosed concussion within the last 12 months? **YES** **NO**
- 10b. Do you have a medical condition that is not listed (such as epilepsy, neurological conditions, kidney problems)? **YES** **NO**
- 10c. Do you currently live with two or more medical conditions? **YES** **NO**

PLEASE LIST YOUR MEDICAL CONDITION(S)
AND ANY RELATED MEDICATIONS HERE: _____


GO to Page 4 for recommendations about your current medical condition(s) and sign the PARTICIPANT DECLARATION.






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2014 PAR-Q+



 **If you answered NO to all of the follow-up questions about your medical condition, you are ready to become more physically active - sign the PARTICIPANT DECLARATION below:** It is advised that you consult a qualified exercise professional to help you develop a safe and effective physical activity plan to meet your health needs.

-  You are encouraged to start slowly and build up gradually - 20 to 60 minutes of low to moderate intensity exercise, 3-5 days per week including aerobic and muscle strengthening exercises.
-  As you progress, you should aim to accumulate 150 minutes or more of moderate intensity physical activity per week.
-  If you are over the age of 45 yr and NOT accustomed to regular vigorous to maximal effort exercise, consult a qualified exercise professional before engaging in this intensity of exercise.



 **If you answered YES to one or more of the follow-up questions about your medical condition:** You should seek further information before becoming more physically active or engaging in a fitness appraisal. You should complete the specially designed online screening and exercise recommendations program - the ePARmed-X+ at www.aparmedx.com and/or visit a qualified exercise professional to work through the ePARmed-X+ and for further information.

 **Delay becoming more active if:**

-  You have a temporary illness such as a cold or fever; it is best to wait until you feel better.
-  You are pregnant - talk to your health care practitioner, your physician, a qualified exercise professional, and/or complete the ePARmed-X+ at www.aparmedx.com before becoming more physically active.
-  Your health changes - talk to your doctor or qualified exercise professional before continuing with any physical activity program.

-  You are encouraged to photocopy the PAR-Q+. You must use the entire questionnaire and NO changes are permitted.
-  The authors, the PAR-Q+ Collaboration, partner organizations, and their agents assume no liability for persons who undertake physical activity and/or make use of the PAR-Q+ or ePARmed-X+. If in doubt after completing the questionnaire, consult your doctor prior to physical activity.

PARTICIPANT DECLARATION

-  All persons who have completed the PAR-Q+ please read and sign the declaration below.
-  If you are less than the legal age required for consent or require the assent of a care provider, your parent, guardian or care provider must also sign this form.

I, the undersigned, have read, understood to my full satisfaction and completed this questionnaire. I acknowledge that this physical activity clearance is valid for a maximum of 12 months from the date it is completed and becomes invalid if my condition changes. I also acknowledge that a Trustee (such as my employer, community/fitness centre, health care provider, or other designate) may retain a copy of this form for their records. In these instances, the Trustee will be required to adhere to local, national, and international guidelines regarding the storage of personal health information ensuring that the Trustee maintains the privacy of the information and does not misuse or wrongfully disclose such information.

NAME _____ DATE _____

SIGNATURE _____ WITNESS _____

SIGNATURE OF PARENT/GUARDIAN/CARE PROVIDER _____

For more information, please contact
www.aparmedx.com
 Email: aparmedx@gmail.com

The PAR-Q+ was created using the evidence-based AGREE process (1) by the PAR-Q+ Collaboration chaired by Dr. Darren E. R. Warburton with Dr. Norman Gledhill, Dr. Veronica Jammik, and Dr. Donald C. McKenzie (2). Production of this document has been made possible through financial contributions from the Public Health Agency of Canada and the BC Ministry of Health Services. The views expressed herein do not necessarily represent the views of the Public Health Agency of Canada or the BC Ministry of Health Services.

Client: a for PAR-Q+
 Warburton DER, Jammik VC, Gledhill N, McKenzie DC, and Strath SJ as behalf of the PAR-Q+ Collaboration;
 The Physical Activity Readiness Questionnaire for eXercise (PARmed-X+) and Electronic Physical Activity
 Readiness Medical Examination (ePARmed-X+). Health & Fitness Journal of Canada 6(2):1-23, 2011.
 Key References:
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Appendix J

Copyright Permissions

Subject: Re: reprint the 2014 PAR-Q+ in appendix
Date: Tuesday, October 14, 2014 at 2:19:15 PM Eastern Daylight Time
From: PARQ Collaboration
To: Tom Sanchez

Dear Tom, on behalf of the PAR-Q+ Collaboration I am pleased to hear that you have found our resource to be useful. I would like to confirm that you have our permission to include the PAR-Q+ in your dissertation. There is no cost to include our document in your thesis. We simply ask that you use our document (as found at www.enarmedx.com). Please note that at least one other agency has attempted to copy (without our permission) our document, so please be sure to use the official PAR-Q+ (2014 PAR-Q+). We also asks that appropriate acknowledgement to our work is made including reference to the official site for the PAR-Q+ and ePARmed-X+ (www.eparmedx.com) and the citations for the work. Therefore, please acknowledge the original sources and include the following credit line: "Reprinted with permission from the PAR-Q+ Collaboration and the authors of the PAR-Q+ (Dr. Darren Warburton, Dr. Norman Gledhill, Dr. Veronica Jamnik, and Dr. Shannon Bredin).

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I appreciate your consideration.

Sincerely,

Dr. Darren Warburton
PAR-Q+ Collaboration

Hi Tom,
You have permission to use the Logic Model in your dissertation.

Sincerely,
Pam

Pamela DeVore, Manager
UW Cooperative Extension Publishing
608.263.2770 | pam.devore@uwex.edu

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On Sep 10, 2014, at 6:16 AM, Tom Sanchez wrote:

Appendix K

Human Protections Determination



27 May, 2014

Mr. Thomas Sanchez
301 Michigan Street, NE, Suite 300
Grand Rapids, MI 49503

Dear Mr. Sanchez,

As discussed in our meeting with Dr. Rebecca Davis on April 28, 2014, the aims and description of the project you are completing for your dissertation entitled, *Primary Care Interventions to Improve Physical Activity In Sedentary Adults Age 18 Through 64* does not fit the U.S. Dept. of Health & Human Services' definition of research. This definition states that research is, "...a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge..." (Code of Federal Regulations, Subpart A, Section 46.102 (d), 2005, 2009).

The determination of this project as **not being research** is affirmed by Dr. Davis and myself. **Because it is not research, submission to GVSU's Human Research Review Committee (HRRC) is not necessary.** You may proceed with this project.

As you move forward, you are cautioned that your project should not be referred to as research when you discuss it with others. Should you change the aims and activities of your project such that it would then meet the definition of research as quoted above, please cease any contacts with potential human subjects until such time as you submit the project protocol to the HRRC and receive the committee's approval to proceed.

Good luck with your project.

Cordially,

A handwritten signature in cursive script that reads 'Cynthia P. Coviak'.

Cynthia P. Coviak, PhD, RN, CNE
Professor & Associate Dean, Nursing Research & Faculty Development

A handwritten signature in cursive script that reads 'Rebecca Davis'.

Rebecca Davis, PhD, RN
Co-chair, Grand Valley State University
Human Research Review Committee



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