Exercise Prescription Checklists for Older Adults

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ABSTRACT

EXERCISE PRESCRIPTION CHECKLIST FOR OLDER ADULTS

By

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Master of Science in Kinesiology

The portion of the world’s population over 65 years of age will triple between 2015 and 2050, resulting in two billion individuals. This demographic aging creates challenges for countries that affect the lives of individuals, their families, the economy, public finances, and the reorganization of health and social systems.

Older adults use more medical services than any other age group except for those under the age of four. Physical activity (PA) is an effective way of preventing and managing many chronic health issues among the older population. Nonetheless few older adults participate in PA and few doctors actually use exercise prescriptions for their patients.

Most primary care physicians and health care professionals do not address the issue of physical activity with older adults due to (a) the limited time they have to spend with a patient during an office visit and (b) their lack of formal training in physical activity.
Creating exercise prescription checklists that individuals can use during discussions with their primary care physician may facilitate older adults’ attempts to begin or improve their physical activity. The individual prescription exercises created for this thesis will be made available through Kick60.com, a website that is focused on exercise prescriptions for older adults.

*Keywords:* exercise prescription, older adults, physical activity, exercise, doctor, physician, endurance, strength, flexibility, balance, aerobic, neuromotor, cardiorespiratory
CHAPTER ONE

INTRODUCTION

The United States spends more money on health care than any other country in the world, and 75 percent of this money is spent on people with chronic conditions (Centers for Disease Control, 2009). In addition, the Centers for Disease Control (CDC) (2009) reports that approximately half of U.S. adults (117 million) have at least one of 10 chronic conditions (i.e., hypertension, coronary heart disease, stroke, diabetes, cancer, arthritis, hepatitis, weak or failing kidneys, current asthma, or chronic obstructive pulmonary disease). The fact that the majority of our health care dollars are spent on chronic conditions likely indicates that many adults in the United States are not aging in as positive a manner as they otherwise might. The concept of positive aging is an active topic of discussion in the literature. Fernández-Ballesteros (2011) states that positive aging has both objective and subjective indicators in four key areas, including: physical fitness and health, cognitive functioning, positive emotional states, and social involvement. This thesis will focus primarily on the physical fitness aspects of healthy and positive aging and examine issues related to older adults obtaining exercise prescriptions from their primary care physicians.

Primary care physicians spend, on average, less than 9.5 minutes with each patient (Cherry, Woodwell & Rechtsteiner, 2007). For elderly patients, this likely provides very little time to ask questions about well care, particularly exercise. This short 9.5 minute interval may cause physicians to emphasize diagnosing an individual’s disease or illness and spend little time on maintaining well care and promoting positive aging. Performing individual assessments regarding exercise, continual well-care, and positive aging are also unlikely to result in billable hours for submission to health insurance.
companies. This confluence of (1) the short amount of time a physician spends with a patient and (2) the billing practices of insurance companies leads to a significant problem for older adults. This lack of physician initiated discussions regarding physical activity (PA) is of great importance, because older adults become less active as they age (Costello, Leone, Ellzy, and Miller, 2013). This decrease in activity makes the assessment of well care and exercising even more important in the maintenance of positive aging.

One possible solution is for older adults to become pro-active by attending their physician appointments with a checklist of questions that might allow physicians to operate within their limited time constraints, providing information and prescriptions for exercise that will promote positive aging.

**Significance**

The increase in the population of people over the age of 65 has both economic and social impacts not only in the United States but around the world. One of the most important of these impacts arises because older adults use more medical services than other age groups, with the exception of children under the age of four (Petterson, Liaw, Phillips, Rabin, Meyers, & Bazemore, 2012). Given the enormous costs of our health care system, renewed emphasis needs to be placed on educating older individuals, health care professionals, physicians, insurance companies, and policy-makers on alternatives to today’s typical practices. For example, physical activity has been demonstrated to be an effective method of preventing and/or managing the effects of a number of chronic health issues among both older males and females (Chao, Foy, & Farmer, 2000). Because of this, an aspect of this renewed educational emphasis might be prescriptive exercise
facilitated by checklists, which may prove to reduce costs as well as improve the lifestyle of the aging population.

Over the past fifty-years, various health and government organizations worldwide have published exercise guidelines which will aid in the creation of the checklists that are intended to facilitate a patient’s discussion with their physician. The American Heart Association (AHA), the Surgeon General, the YMCA, the President’s Council of Physical Fitness, and others have all published reports dating back to the 1940’s. In 1995, The American College of Sports Medicine (ACSM) along with the U.S. Department for the Center of Disease Control (CDC), the U. S. Surgeon General and National Institute of Health all published guidelines and recommendations on physical fitness and activities. The initial ACSM guidelines said that every adult in the United States should accumulate 30 minute or more of moderate-intensity exercise most days of the week (ACSM, 1995). The ACSM in the 9th edition of the Guidelines (2014) created specific guidelines for older adults (men and women over the age of 65) and adults between the ages of 50 to 64 with clinically significant chronic conditions and/or functional limitations. An important goal for the ACSM is specification of the amount and intensity of physical exercise in order to improve individual health (ACSM, 2014). While the recommendations for older adults are similar to those of all adults, the ones for older adults aerobic/endurance exercising is specifically related to an individual’s cardiorespiratory fitness (CRF) Level (ASCM, 2014). Age specific recommendations are also made for flexibility exercise, balance and neuromotor exercise as well as strengthening exercises. A review of the literature regarding older adults and physical
activity shows that a majority of published papers use the ACSM/AHA Guidelines as compared to the others.

Problem

While the ACSM/AHA Guidelines will help create the exercise prescription checklists they have a couple of associated problems that are worth noting. First, many older adults (and perhaps their caretakers and/or children) do not know that these guidelines exist and if they do know, the recommendations contained in the guidelines may not be readily available or understood and the different organizations may be confusing (especially since the guidelines are similar). Secondly, each new chronic illness or injury comes with a new set of physical activity issues which must be properly addressed. The guideline’s problem in this regard arises from the fact that no one physical activity or exercise regimen fits everyone. Thus, it is important that the discussion of physical activity with the primary care physician be disease-specific and individually based.

Health information is one of the most widely searched topics on the World Wide Web (McMullan, 2005). Based on a 2012 research study by Pew Research Center, 72% of internet users say they looked online for health information within the past year, with most commonly-researched topics being specific diseases or conditions, treatments, or procedures (Pew Research Center, 2014). McMullan (2005) reviewed multiple empirical studies from health electronic databases between the years 1985–2005 and discovered that while patients do not see the Internet as a replacement for the health professional, patients do want to be informed prior to seeing their doctor or other health care professional. McMullan (2005) discovered that because of the specializations within the medical profession, doctors are often perceived by their patients as being impersonal and
aloof. Individuals reported that they use the Internet due to the limited amount of time they have with a health care professional, and because of this limited time, individuals are often frustrated and dissatisfied with the information provided by the physician (McMullan, 2005). In addition, individuals reported that because of the immediacy of information via the Internet, they often felt more informed than the physician and were able to better find treatment options (McMullan, 2005). This scenario can be solved by physicians and health care professionals if they actively recommend specific websites that they know are factually based (Gerber, & Eiser, 2001). Gerber and Eiser (2001) term this scenario the ‘Internet prescription’.

Having a checklist for exercise that the older adult could use during visits with physicians may result in a physical activity prescription or simply, an exercise prescription. Health care professionals can also direct their patients to websites that have correct exercise instructions and precise and safe video demonstrations. This type of discussion may create a team approach to improving health with both the medical professional and patient actively involved in the discussion. A website that focuses specifically on exercise prescriptions, physical activity for older adults, and is specifically designed for older adults can provide valuable material and discussion not only with medical personnel, but with peers.

**Justification of Project**

The author of this thesis is a 67 year-old female with forty plus years of content development experience as a journalist (NPR, CBS, Post-Newsweek) and an Associate Professor at California State University, teaching digital media. She came to academia after professionally working in new media and website development for 12 years.
(Disney, Viacom New Media, GeoCities.com, Homestore.com). She returned to graduate school in Kinesiology because she identified a need among older adults for useful and reliable content on physical exercise. She felt that the process of creating and delivering this content would be enhanced by acquiring knowledge on human movement, anatomy, and physiology through a formal education process.

In anecdotal discussions over the past four years, the author has spoken with numerous older individuals regarding physical activity. Not one person knew the recommended requirements for physical activity performed by individuals in their age group. In addition, few of these individuals had spoken with their doctor about PA because (a) they didn’t know what to ask and (b) there wasn’t enough time to have these discussions during a regular appointment. These discussions, along with her background in content development, were the genesis of the idea that checklists, presented on a publically accessible website, could facilitate communication with healthcare professionals regarding PA.

**Abbreviations and Definition of Terms**

ACSM: American College of Sports Medicine. ACSM, founded in 1954, and based in Indianapolis, Indiana, promotes and integrates scientific research, education, and practical applications of sports medicine and exercise science. ACSM members represent more than 70 disciplines in sports medicine and exercise science and offers membership in six categories; clinicians, academicians, scientists, health & fitness professionals, students, and international

CDC: Center for Disease Control and Prevention. ([http://www.cdc.gov/](http://www.cdc.gov/)). The CDC is a federal agency under the Department of Health and Human Services.
Older Adults: The literature does not provide a single agreed-upon definition of an active retired adult. Various studies have categorized this group ranging from 50, 52, or 60 years of age to 65 years of age. For purposes of this study, an active retired adult is defined as an individual, male or female, 65 or older. This age was adopted in part because the ACSM defines an older adult as an individual who is 65 years of age or older (ACSM, 2014). ACSM has added the following to its definition of an older adult, “individuals 50 to 64 years of age with clinically significant conditions or physical limitations that affect movements, physical fitness, or physical activity” (ACSM, 2014, p. 204; Skinner, 2005, p. 85).

PA: Physical Activity. PA is a body movement that requires the use of muscles and requires more energy than resting. A more scientific definition is provided by Howley (2001) who states that PA is any bodily movement produced by contraction of skeletal muscle that substantially increases energy expenditure. Intensity and duration of exercise vary among individuals, so the amount of energy expended differs.

Limitations

Individual physicians may not be well versed in physical activity, or understand the risks and benefits of the various exercise types, various modalities, and different doses (repetitions, sets, frequency, and velocity) (Singh, 2002), which may leave the older adult frustrated after an office visit. According to the 2000 Medical School Graduation Questionnaire, over 90 percent of graduates said that physicians can be influential in counseling patients on physical activity, yet nearly half reported receiving inadequate medical education on physical activity (Association of American Medical Colleges, 2002). Garry, Diamond, and Whitley (2002) sent surveys to the Assistant Deans of all U.S. allopathic medical schools. Only 13 of the 102 responding schools
said they provided instructions for medical students in either the benefits or advice regarding physical activity (Garry, Diamond, & Whitley, 2002). In those 13 schools, the median number of hours spent on physical activity ranged from two to ten hours in the first two years of medical school and during the last two years a range of two to 23 hours. Garry, Diamond and Whitley (2002) noted that the remaining 89 medical schools that responded to the survey had no curriculum in physical activity/exercise and 76 percent said that their schools had no plans to include such a course or module in their curriculum.

Because exercise and its effects vary significantly among individuals there are many factors that need consideration when specifying an exercise regimen including training regimen, environmental conditions, and individual factors, including habitual physical activity (Garber, Blissmer, Deschenes, Franklin, Lamonte, Lee, & Swain, 2011). While the prescription checklist will aid in a discussion, individuals along with their doctors, must factor in these additional items.

**Organization of the Project**

The remainder of this document is divided into five chapters. Chapter Two contains a review of the literature covering the aging population, the benefits of exercise by older adults, barriers to exercise among older adults, use of technology among older adults, exercise prescriptions, and evaluation of exercise. Chapter Three discusses the development of this project which includes both the exercise prescription checklists and the website, Kick60.com. It includes Kick60’s site map and other specific features of the website that is being developed as part of this thesis project. Chapter Four provides the details of a competitive analysis of several health and exercise websites. Chapter Five
focuses on expected results and follow-up version of the website. Chapter Six presents conclusions as well as further work to be completed either on the website or additional research studies.
CHAPTER TWO

LITERATURE REVIEW

Prescribing exercise to older adults is important for their well-being (Chakravarthy, Joyner, & Booth, 2002). Physical activity among the elderly can be viewed as a primary therapy prescription that will prevent more costly illnesses. As a result, primary care physicians should be prescribing exercise to their patients. At the same time, however, older adults need to be proactive in obtaining this comparatively low-cost therapy to aid them in healthy aging (Blair, & Church, 2004). This literature review examines the connection between exercise and well-being in older adults by discussing the following issues: the aging population, benefits from exercise and PA, the barriers to exercise among this age group, physician prescribed PA, use of technology among older individuals, exercise prescriptions, and exercise validation.

The Aging Population:

The global population is aging. The world's elderly population—people 60 years of age and older—is currently 650 million and is expected to rise to two billion by the year 2050 (World Health Organization, 2011a). In 2011, the oldest members of the United States postwar baby boom turned 65-years-of-age (Cohn, & Taylor, 2010; Mangan, 2011). Over the next nine years, the number of Americans age 65 or older will rise from 40.2 million to 54.8 million (U.S. Census Bureau, 2011). By 2030, nearly one-fifth of Americans will be over the age of 60 (Centers for Disease Control, 2003; Passel, & Cohen, 2008). In the United States, the baby boomers are redefining old age in America. This generation makes up 26 percent of the population or 80 million individuals (Cohn, & Taylor, 2010). Similar statistics indicate that this is a global phenomenon. As
examples, the elderly population in Taiwan is growing faster than in most developed
countries because of the low birth rate among women aged 15-49 (National Statistical
Office, R.O.C., 2009). In 2005, the life expectancy of people living in Japan was more
than 80 years of age (World Health Organization, 2011b). It is expected that in 2030, the
population of retirement age individuals in Poland (women over 60, men over 65 years of
age) will rise to 24 percent of the population (Stenning, 2005). While these facts may be
notable, American author and pop-culturist William Geist (1997) states it succinctly
saying that another boomer turns 50 years of age every seven seconds, or in raw numbers
10,000 baby boomers turn age 65 each day (Cohn, & Taylor, 2010).

The Age Lab at Massachusetts Institute of Technology has identified that aging is
a disruptive force in countries and their economies (MIT, 2012). The Age Lab (MIT,
2012) suggests that this arises because there are fewer family caregivers and working age
adults that are supporting the aging portions of their society. In other words, the cost of
aging is increasing. The U.S. Social Security Administration estimates that the costs of
Social Security and Medicare will rise from its current level (approximately four percent
of the gross domestic product (GDP) to over six percent of the GDP in 2050 (SSA, 2012).
Because the U.S. GDP is in the trillions of dollars, this small percentage increase
represents many billions of dollars per year. Researchers have provided evidence that
medical costs for inactive older adults are substantially higher than for active older adults
(Elsawy, & Higgins, 2010). Research suggests that it may be possible to lower the health
care costs of older adults by (1) improving their level of PA, and (2) addressing five other
effects, (a) cardiovascular concerns, (b) muscle function, (c) bone loss, (d) psychological
well-being and (e) other health related issues specific to the individual (Fernández-
Ballesteros, 2011). While the U.S. population ages, many older Americans are concerned about maintaining their physical health. The United States Aging Survey (National Council on Aging, 2015) found that the top three concerns older individuals have are maintaining their physical health (40 percent), memory loss (35 percent) and maintaining their mental health (32 percent). Despite the evidence that indicates physical activity is important for healthy aging, only 28 to 34 percent of adults between the ages of 65 and 74 indicate that they are physically active (CDC, 2014).

**Benefits of Exercise for Older Adults**

Previous research provides evidence that the physical and psychological benefits derived from regular PA actually improve one’s health (Schutzer, & Graves, 2004). This evidence indicates that a lack of PA contributes to chronic diseases among the older population, including cardiovascular disease, lung disease, Alzheimer’s, stroke, type 2 diabetes mellitus, hypertension, obesity, osteoporosis, depression, and cancer, as well as falls (Elsawy, & Higgins, 2010; Marcus, Williams, Dubbert, Sallis, King, Yancey, & Claytor, 2006). Older adults who include exercise in their daily routine can lower their risk for diabetes, heart disease, and stroke as well as sharpen mental acuity, reduce anxiety, and improve mood (Chakravarthy, Joyner, & Booth, 2002). There are also expectations for longer lives, with technology promising to improve the quality of that life (MIT, 2012). In order for individuals to take advantage of longer, higher quality lives, they need to improve their health, which means having more information regarding how PA can benefit their lives (Marcus, Williams, Dubbert, Sallis, King, Yancey, & Claytor, 2006).
In addition to the above, The U.S. Department of Health and Human Services (2008) notes that there is strong evidence that older adults who exercise have a decreased risk of heart disease, stroke, type 2 diabetes mellitus, high blood pressure, adverse blood lipid profile, metabolic syndrome, colon cancer, and breast cancer. They also noted other areas that benefit from exercise including prevention of weight gain, incidence of falling, reduced depression, and improved cognitive function (U.S. Department of Health and Human Services, 2008). The Report on Physical Activity and Health from the U.S. Surgeon General’s office notes that men and women who are inactive are almost twice as likely to develop heart disease as those who are more active (U.S. Department of Health and Human Services, 1996). Researchers in the United Kingdom found that women over the age of 60 who exercise regularly and don't smoke may have a substantially lower risk of late-life disability than their peers with less-healthy habits (Kim, Adamson, & Ebrahim, 2013). Multiple studies have provided additional evidence that physical frailty, and not disease itself, is the most important determinant of whether elderly individuals can care for themselves and remain vital members of the community (Nuland, 2010).

Loss of muscle strength is a major factor in the process of frailty (Lamberts, van den Beld, & van der Lely, 1997). This loss of strength may be caused by the aging of muscle fibers and their innervations, osteoarthritis, and chronic debilitating disease (Lexell, Taylor, & Sjöström, 1988). However, researchers have also identified that a sedentary lifestyle and decreased PA and disuse are also important determinants of the decline in muscle strength (Lamberts, van den Beld, & van der Lely, 1997). And, most important, with exercise, muscle strength can be almost doubled within eight weeks, even in the oldest of the old (Nuland, 2010). Paffenbarger, Hyde, Wing, and Hsieh (1986)
report that a modest increase in life expectancy could be expected even when individuals
did not begin regular exercise until the age of 75.

Four specific areas of exercise that the elderly should focus on have been
identified by the American College of Sports Medicine (ACSM, 2014), the United States
Department of Health and Human Services (2008), the American Heart Association
(2008), and by American Family Physicians (Elsawy, & Higgins, 2010; Nied, &
Franklin, 2002). They are cardiorespiratory/aerobic exercise, resistance/weight training,
flexibility, and neuromotor/motor skills training (ACSM, 2014; Garber, Blissmer,
Deschenes, Franklin & Lamonte, 2011). A simpler way of stating this is that exercise
programs generally consist of four major components: endurance, strength, balance, and
flexibility (ACSM, 2014; Frankel, Bean & Frontera, 2006). There are exercises that can
be prescribed for older adults that can help in a combination of these areas. Each area is
briefly examined below.

**Cardiorespiratory and Aerobic Exercise**

It is widely agreed that cardiorespiratory and aerobic (endurance) exercise is
important, regardless of age, weight, or athletic ability. Aerobic exercise causes
individuals to breathe faster and more deeply, maximizing the amount of oxygen in the
blood (Guiney, & Machado, 2013). Cardiovascular exercise is most directly linked to
cardiovascular fitness (Vigorito, & Giallauria, 2014). Cardiorespiratory and aerobic
exercise is considered the cornerstone of physical exercise, because the better an
individual’s aerobic fitness, the more efficiently the heart, lungs, and blood vessels
transport oxygen throughout the body, making it easier to do routine daily physical tasks.
The major benefits for older adults who have a regular aerobic exercise regimen include weight control and reduction of obesity, fatigue reduction and increased stamina, and activation of the immune system, which leaves older adults less susceptible to colds and flu (Grande, Keogh, Hoffmann, Beller, & Del Mar, 2015). Mayo Clinic (2015) notes the top reasons for aerobic exercise are that it reduces health risks including heart disease, high blood pressure, type 2 diabetics, metabolic syndrome, and stroke. Weight-bearing aerobic exercises, such as walking and swimming, reduce the risk of osteoporosis, lowers blood pressure, controls blood sugar, and strengthens the heart, potentially creating less buildup of plaque in arteries, and reducing tension and depression (Hollman, 2012; Vigorito, & Giallauri, 2014). Numerous studies indicate that people who participate in regular aerobic exercise tend to live longer than those who don’t do aerobic exercise. Over time, regular aerobic activity likely increases the overall strength and fitness of the heart and cardiovascular system.

Endurance training has been shown to be effective in improving both muscle strength and muscle mass in elderly women with chronic heart disease (Pu, Johnson, Forman, Hausdorff, Robenoff, Foldvari, & Singh, 2001). The management of chronic heart failure is characterized by a combination of drugs and lifestyle changes. Rees, Taylor, Singh, Coats, and Ebrahim (2004) conducted a meta-analysis of 29 chronic heart failure exercise studies that involved endurance training with 1126 patients from medical journals from 1984 to 2001. The majority of the studies included both patients with primary and secondary heart failure. The results indicated that endurance exercise improved individual’s fitness and quality of life. Individuals with heart failure often restrict their physical activities because of breathlessness and restricted heart capacity.
While the type, amount, and duration of exercise varied by study and individual, the outcome was that most short term trials of endurance exercise improved the individuals’ quality of life and daily tasks. Individuals with chronic heart disease need to be seeing a cardiologist, who should be knowledgeable regarding the American Association of Cardiovascular and Pulmonary Rehabilitation guidelines and the American College of Cardiology Foundation/American Heart Association Guidelines for Heart Failure, which included exercise recommendations (Yancy, Jessup, Bozkurt, Butler, Casey, Drazner, & Wilkoff, 2013).

The incidence of fatigue and sleep disturbances is high among older adults, with nearly 50 percent of the elderly population experiencing some difficulty in initiating sleep or having chronic insomnia (Crowley, 2011). Insomnia in older adults is associated with mood disorders and depression (Ancoli-Israel, 2009). Reid, Barron, Lu, Naylor, Wolfe, and Zee (2009) conducted a 16 week intervention with healthy older community dwelling men and women. The participants were screened for sleep disorders and then received sleep hygiene education along with an exercise prescription of at least two of three aerobic activities (walking, stationary bicycle, or treadmill) daily. After 16 weeks, the participants found that they slept 1.25 hours longer after commencing the aerobic exercise program.

The ACSM (2014) recommendations for older adults regarding endurance exercise is moderate-intensive activity for a minimum of 30 minutes five days a week (150 minutes), or vigorous-intensity endurance exercise for a minimum of 20 minutes three days a week (75 minutes). Moderate-intense and vigorous-intense can vary for older adults, based on their current fitness level. For older adults, a one to ten point
scale, where zero is sitting and a ten is all-out effort; moderate intensity-endurance activity is a five to six and produces a noticeable increase in heart rate and breathing. For some older adults, a moderate-intensity walk may be a slow walk and for other older adults it may be a brisk walk (Nelson et al., 2007).

**Resistance Training**

Resistance training (strength training) is effective in increasing muscle mass (Hollmann, Strüder, Tagarakis, & King, 2007). Resistance training provides a stress to the muscles that causes them to adapt and get stronger. Muscle strength declines approximately 15 percent each decade after the age of 50 (Daley, & Spinks, 2000). After the age of 70, the muscle strength decline increases dramatically to 30 percent each year (Daley, & Spinks, 2000; Krist, Dimeo, & Keil, 2013). The main cause of this decrease is the reduction in the number of muscle fibers and atrophy of type II muscle fibers (Lexell, Taylor, & Sjöström, 1988). Resistance training has been shown to reverse tendon stiffness and reduce the risk of strain injuries among older individuals (Krist, Dimeo, & Keil, 2013).

Strength is intrinsic to daily function, including walking endurance, stair-climbing ability, and daily tasks such as carrying groceries (Hunter, McCarthy, & Bamman 2004). Failure of these daily functions is due to muscle loss, which comes from inactivity. Most of the variance in walking speed in the elderly is related to leg strength, and increased strength has been shown to improve walking endurance and stair-climbing power. Neid and Franklin (2002) note that strength training improves nitrogen balance and can, when combined with adequate nutrition, prevent muscle wasting in institutionalized elderly persons. Muscle weakness, particularly of the lower limbs, is associated with reduced
walking speed (Buchner, 1993), and increased risk of disability (Guralnik, Ferrucci, Simonsick, Salive, & Wallace 1995). Liu and Lantham (2009) reviewed 121 randomized controlled trials with 6700 participants all over the age of 60 and found that progressive resistance training resulted in a modest improvement in gait speed. Progressive resistance training is a form of exercise where participants exercise their muscles against some type of resistance that is progressively increased as their strength improves. Normally the exercise is done two to three times a week at moderate to high intensity using free weights, elastic bands, or exercise machines. Liu and Lantham (2009) noted that in their review of the controlled trials, there was significant improvement in physical ability among older individuals with a large positive effect on muscle strength.

Muscle strength is also a significant factor in falls. Danneskiold-Samsøe, Kofod, Munter, Grimby, Schnohr, and Jensen (1984) found that upper body and arm muscle strength decline with age. This is especially important because these muscles are important for reaching which is one way for individuals to accomplish change-in-support when falling. In a study examining fall inducing perturbations, younger subjects (with more strength) were better able to counteract the perturbation than older subjects who required a compensatory step (Jensen, Brown, & Woollacott, 2001). In addition, reaching to stop a fall is often easier for older adults than compensatory stepping. This suggests that strength training may be beneficial in countering age related deficits in neuro-musculoskeletal systems that interfere with the ability of reaching to effect change-in-support.

Resistance exercise aids in the management or prevention of type 2 diabetes (Bweier et al, 2009; Westcott, 2012). It is estimated that by the year 2050, 40 million
adults 60 years of age or older will have Type 2 diabetes (Gambert, & Pinkstaff, 2006). Type 2 diabetes is often associated with obesity and visceral adiposity (Gregg, Beckles, Williamson, Leveille, Langlois, Engelgau, & Narayan, 2000). Resistance training along with flexibility training may be more attractive than aerobic exercise to people with Type 2 diabetes who are often overweight and sedentary (Brooks, Layne, Gordon, Roubenoff, Nelson, & Castaneda-Sceppa, 2007.) Castaneda, Layne, Munoz-Orians, Gordon, Walsmith, Foldvari, and Nelson, (2002) found in a study with 62 older Latino males conducted at the New England Medical Center in Boston that resistance training resulted in improved metabolic control. The 16 week study, where participants did not change their diet, but completed a 45 minute resistance training program three times a week, established that resistance training reduced the requirement for diabetes medications, reduced abdominal adiposity and systolic blood pressure, as well as increasing muscle strength.

Resistance training also improves joint function and reduces pain in individuals with osteoarthritis (Bautch, Clayton, Chu, & Johnson, 2000). Osteoarthritis (OA) is the most common type of arthritis and increases with age (Lawrence, Felson, Helmick, Arnold, Choi, Deyo, & Wolfe, 2008). It affects the knees and hands of women more frequently than men, especially in individuals over the age of 50 (Lawrence et al., 2008). Mild to moderate osteoarthritis of the knee is a condition of approximately 65% of middle aged and elderly population, especially women (Dieppe, 1994). Topp, Woolley, Hornyak, Khuder, and Kahaleh, (2002) conducted a study of 102 individuals divided into groups that performed dynamic or isometric resistance training. The individuals participated in strength exercises for the legs, three times weekly for 16 weeks. Both
groups decreased knee pain while increasing performance on functional tasks by 28 to 58 percent, with the results of the two groups noted not to be significantly different. An investigation by Callahan et al., (2008) which studied the effects of strength training in 347 females whose mean age was 70 (range 55-90 years), demonstrated that 90 percent of the women showed improvement in pain and fatigue as well as self-efficacy for managing the arthritis. When participants increased the number of strength training classes, they discovered that strength improved in the upper arms and extremities (Callahan et al., 2008).

Research indicates that resistance training may reduce the risk and/or severity of musculoskeletal injuries (Shaw, Shaw, & Brown 2015) and reverse or slow down sarcopenia (Shaw, Shaw, & Brown 2015). Sarcopenia, an age-related loss of muscle mass, is found in elderly individuals who demonstrate decreased skeletal muscle mass and function (Morgan, 2012). Bone mineral density is related to muscle mass and strength in older adults, implicating sarcopenia in the development and progression of osteoporosis (Hunter, McCarthy, & Bamman, 2004). Strength loss that results from sarcopenia decreases an individual’s ability to perform some of the basic tasks of daily living, such as carrying groceries, opening a jar, or even, getting up off a chair. Data from the 2004 through 2007 National Health Interview Survey found that one out of four individuals over the age of 55 have difficulty walking a quarter of a mile, one out of five adults aged 55 had difficulty pushing or pulling large objects, and 15.2% of adults aged 55 and over had difficulty carrying 10 pounds (Schoenborn, & Heyman, 2009).

Sarcopenia is not considered a disease, rather a collection of symptoms that lead to functional deficits and comorbidity (Morgan, 2012). Lack of exercise is considered a
significant risk factor among the elderly, including those with sarcopenia (Abate, Di Iorio, Di Renzo, Paganelli, Saggini, & Abate, 2007). The collection of sarcopenia symptoms may arise because the entire musculoskeletal system of muscle, neuromuscular responsiveness, endocrine function, tendon, joint, ligament, and bone depends on regular and lifelong exercise (Abate, Di Iorio, Di Renzo, Paganelli, Saggini, & Abate, 2007). Abate et al., (2007) note that while it is highly unlikely individuals with sarcopenia will regain the muscle strength they had when they were 50 years of age, resistance exercises demonstrate an increase in both strength and power. A gain of five to ten percent in muscle cross sectional area, along with an increase of 20 to 100 % or more in muscle strength (depending on the muscle group), is a reasonable expectation from correct exercise regimen (Galvao, Newton, & Taaffe, 2005). This is further supported by Morgan’s (2012) review of 121 randomized controlled trials, with a population of 6700 participants. In most of the reviewed studies, resistance training was performed two to three times a week and elicited notable increases in muscle strength, a moderate increase in walking distance, and better performance rising from a sitting position.

While the majority of this literature review has focused on community based living, there are studies conducted at nursing homes with elderly individuals that indicated resistance training improves mobility, muscle strength and quality of life (Krist, Dimeo, & Keil, 2013). One such study involved nursing home residents in Germany where ten (four men with mean age of 88 years and six women with mean age of 81 years) participants completed an eight-week program of progressive resistance using six gym machines: chest press; rowing machine and butterfly reverse for the upper limb; leg press and leg extension for the lower limb; and a crunch trainer for the abdominals.
Individuals trained for 45 minutes twice a week, with three sets of eight repetitions at each of the individual weights. Mobility increased in every individual on the Elderly Mobility Scale and muscle strength improvements were noted with every machine. Specifically notable was the increase in muscle strength with the rowing machine and leg extension machine with the weight lifted doubling after eight weeks.

The ACSM guidelines (2014) recommend similar exercises for older adults as those recommended for adults in generals but note that muscle strengthening activity needs specific emphasis. The guidelines recommended muscle strengthening activities be performed on two or more nonconsecutive days per week. If individuals do strength exercises two days in a row, they should not exercise the same muscle group. Sessions should be approximately 30 minutes, performing eight to ten exercises involving the major muscle groups. Each exercise should be repeated ten to 15 times. In addition, it is recommended that older adults should exceed the minimum recommended amount if they have no medical conditions that would preclude higher amounts of physical activity (Nelson, Rejeski, Blair, Duncan, & Judge, 2007).

**Flexibility Exercise**

Flexibility exercises appear to be the least studied and the health benefits of these activities are not as specific as the other three exercise types (Frankel, Bean, & Frontera, 2006; Nelson, Rejeski, Blair, Duncan, Judge, King, & Castaneda-Sceppa, 2007; Patterson, & Warburton, 2010). However, flexibility exercises improve range of motion and posture, decrease muscle tension, stretch muscles, and enable the body to stay limber, providing freedom of movement for other exercises and are joint specific. Flexibility exercises are key in enabling individuals to successfully perform daily activities, such as
dressing, walking, and preparing meals, that allows an older adult to remain independent (Garber, Blissmer, Deschenes, Franklin, Lamonte, Lee, & Swain, 2011; Nelson, Rejeski, Blair, Duncan, Judge, King & Castaneda-Sceppa, 2007).

Historically, research regarding exercise and aging has focused on cardiorespiratory/aerobic, with the most attention given to walking (Shaw, Shaw, & Brown, 2015). Due to this preponderance in the literature, health professionals have tended to prescribe this form of exercise. In recent years, more research on strengthening and flexibility exercise for older adults has been conducted. Stretching exercises are used extensively in a rehabilitation context where an injury or disease (e.g., arthritis) may have resulted in a restricted range of motion specific to specific joints (Stathokostas, Little, Vandervoort, & Paterson, 2012). While the goal of these physical therapy sessions is to regain range of motion, the flexibility exercise is not always carried out when the older adult returns to their routine life-style (Stathokostas, Little, Vandervoort, & Paterson, 2012).

While joint flexibility may decrease with age, with the potential to affect normal daily function, older adults do maintain the ability to improve flexibility through stretching exercises (Paterson, & Warburton, 2010). Hulya, Sevi, Serap, and Ays (2015) discovered an improvement in flexibility in a six month supervised exercise program of 85 adults (37 women and 48 men), whose mean age was 69 ± 0.44 years (range 65-84 years). The supervised exercise program was led by the same physiotherapist for two days per week over six months. The exercise program included strengthening exercises in sitting and standing positions as well as stretching and balance activities. Interestingly, individuals over the age of 70 showed greater improvements in flexibility than those who
were 65-69. The authors speculated that the older group may have improved their flexibility because they had a higher participation in the exercise program and that their level of flexibility was not as high to begin with as the younger participants.

Use of stretching programs has been examined as a preventative measure for hip related injuries (Crisopoliksi, Barela, Leite, Fowlder, & Rodacki, 2009). Crisopoliksi, Barela, Leite, Fowlder, and Rodacki (2009) report that stretching can be used to improve range of motion as well as potentially reversing some age-related changes that influence gait performance. Those older adults who participated in the stretching program had a greater range of motion in both the ankle and the hip than the control group, with increased step length, higher velocity and reduced double support time after training (Crisopoliksi, et al., 2009). Other results showed greater anterior and lateral pelvis tilt and also greater hip rotation. The data showed that the stretching program reduced tightness of the tissues surrounding the hip and pelvis.

Evidence exists indicating that balance issues related to aging and disease leads to an increased risk of falls. A longitudinal study that compared resistance training and flexibility training found significant improvements in balance with both interventions (Barrett, & Smerdely, 2002). The limitations of ankle range of motion have been demonstrated as an important factor affecting balance control (Menz, Morris, & Lord, 2005). Burke, Franca, De Meneses, Pereir, and Marques (2012) found that women over the age of 65 participating in a stretching program had improvements in hamstring length, knee flexion strength and movement. Another group of similar women participated in a strengthening program and they had better knee extension strength, and directional control. While they found that those who did only strengthening exercises had greater
knee strength and directional control, but when individuals combined resistance exercises with flexibility exercises the outcome was improved postural control in women over 65 who had been diagnosed with osteoporosis.

McAuley, Wójcicki, Gothe, Mailey, Szabo, Fanning, & Mullen (2013) have focused on creating low cost home-based exercise programs. Through the use of technology, they provided exercise programs, entitled FlextoBa, which were provided on a DVD to 206 elderly community based individuals in outlying areas in central Illinois. The purpose of FlextoBa was to provide an exercise intervention program to elderly individuals in geographical areas who could not attend or did not have access to a center-based activity program. The six month FlextoBa strengthening and flexibility program indicated what was termed “modest” improvements in physical performance especially upper and lower extremity flexibility (McAuley, et al., 2013).

Flexibility exercises have important impacts on balance, gait speed, and lower extremity strength (McAuley, et al., 2013). However caution is sometimes required. Han, Yuk, Hwangbo, Suh, & Kim (2014) found that their older subjects (all over the age of 65) had temporary difficulties in maintaining balance after Plantar Flexor Static Stretching, but that their gait and dynamic balance were not affected after a short rest period. Plantar Flexor Static Stretching is often used to reduce ankle stiffness and improve joint mobility. The researchers noted that performing plantar flexing static stretching for five minutes or more could adversely affect balance immediately after the stretch but that dynamic balance and gait were not adversely affected after a subsequent short period of time.
The ASCA (2014) recommends flexibility exercises at least two or three times a week, preferably daily, with each stretch being held 30 to 60 seconds. Stretches should be static, in other words, assume the position, hold the stretch and then relax, or dynamic, which is fluid motion, such as yoga, or a combination of the two. Individuals should stretch to a feeling of tightness but without pain. Each stretch should be done two to four times, accumulating 60 seconds per stretch. Yoga combines a series of poses with breathing and it is not only an effective flexibility exercise, it also works on strength and balance.

**Neuromotor and Motor Skills Training**

Sometimes referred to as functional fitness exercising or balance exercise, neuromotor and motor skills exercises improve balance, coordination, and muscle strength, and aid in mitigating the risk of falls as well as the fear of falling. While the ACSM (2014) has no specific recommendations for balance neuromotor/motor skills training, it is highly recommended that exercises be performed a minimum of two to three times a week for balance and agility to aid in reducing and prevention of falls.

Falling is the most common type of accident among individuals over the age of 65. (Høst, Hendriksen, & Borup, 2011). One out of three individuals in this age group falls at least once a year (Horst, et al., 2011). Unfortunately falling is part of the aging process and in an even more unfortunate turn often leads to hip fractures. Within the first year after a hip fracture approximately half of all individuals are unable to walk independently and require assistance with daily activities (Cassell & Clapperton, 2010).

A combination of intrinsic and extrinsic factors contributes to falling in older adults. The intrinsic factors include, muscle weakness, gait and balance dysfunction,
visual impairment, cognitive impairment, depression, and medications. The extrinsic factors include, footwear, lighting, and environmental obstacles (Lin & Lane, 2005). All of these factors can combine in a myriad of ways to cause people to fall. Exercise from the four areas noted by Garbar, et al. (2011) and examined above can help reduce the possibility of falls as well as aid in recovery after a fall, with special emphasis on strength and balance.

There are two important areas of research, gait characteristics and muscle strength, which may illuminate fall prevention strategies. Older adults often take a longer time (39 percent longer than younger adults) to complete walking tasks, have a longer distance to the last foot contact, and use two or more steps in preparation to turn or stop (Menant, Steele, Menz, Munro, & Lord, 2009). A primary reason for this may be age-related delay in muscle activation and decreased strength in the lower limb muscles. All of this contributes to slowing and a reduction in the extensor torque magnitude needed to effectively stop.

Gait and postural issues arise because reduced lower extremity strength has been associated with reductions in gait speed and balance. Hip, knee, and ankle strength decline by up to three percent per year after the age of 50, with knee-extensor decreasing in strength at an even greater rate after the age of 70 (Danneskiold-Samsøe, et al., 1984). In addition, muscle strength is significantly lower in women (who have a higher risk of falling) than men in all muscle groups except for plantar and dorsal flexion of the foot (Danneskiold-Samsøe, et al., 1984).

Gait speed has recently come to be considered an important indicator of an individual’s health status, as well as one of the many variables associated with falls
among older adults. Studenski, Perera, Patel, Rosano, Faulkner, Inzitari, and Guralnik, (2011) provided evidence of a ten year survival differential across a range of gait speeds, in a pooled analysis of nine cohort studies with 34,485 community dwelling adults, with a mean age of 73.5. Predicted years of remaining life for both males and females increased as gait speed increased. Studenski et al., (2011) suggest that gait speed is related to survival because walking requires energy, along with balance and places demands on heart, lungs, circulatory, and musculoskeletal system. Slower gait speed may reflect damaged systems and/or a higher energy cost associated with walking as age increases.

As noted earlier, a combination of strength and flexibility along with motor-skills all combine to aid in the prevention of falls. Muscle strength is also a significant factor in falls. Upper body and arm muscle strength decline with age (Danneskiold-Samsøe, et al., 1984). This is especially important because these muscles are important to reaching which is one way for individuals to accomplish change-in-support when falling. In a study examining fall inducing perturbations, younger subjects (with more strength) were better able to counteract the perturbation than older subjects, who required a compensatory step (Jensen, Brown & Woollacott, 2001). As noted above, reaching to stop a fall is often easier for older adults than compensatory stepping.

Postural control, the act of maintaining, achieving, or restoring a state of balance, is a common mechanism to compensate for unexpected displacements of the body. Pollock, Durward, Rowe, and Paul (2000) note that balance exercises are crucial for older adults because strategies used for balance are either predictive or reactive and involve either a fixed-support or a change-in-support response. Kim and Robinson (2005) note that a large number of falls in older adults are due to impaired postural control when
encountering unexpected displacement of the body. Loss of balance occurs when the
base of support and the center of mass are not in equilibrium. Maki, et al, (2008)
identified impaired control of lateral stability as a major problem for the elderly since
lateral falls often result in a hip fracture. It is not the control of balance that results in
falls, but the inability to recover from the loss of balance that determines if a fall occurs.
When an individual makes a conscious decision to step, they shift their change-in-support
toward the stance leg before lifting the swing foot. During forward and backward steps,
these anticipatory posture adjustments are not present, thus the lateral fall needs to be
stopped before landing. Lin and Lane (2005) recommends that doctors and physical
therapists should assess gait, including heel, toe, and tandem gait which would identify
what specific muscle groups have deficiencies. For example, many older adults have
difficulty performing heel gait (Lin and Lane, 2005) because they walk with a slow,
unsteady, and shuffling gait. Lan, Chen, Lai, & Wong, (2013) specifically note that
during performance of Tai Chi weight shifting, body rotation, and single-leg standing in
different position are frequently practiced. Delicate joint control with muscle
coordination is required during motions, and hence balance function may benefit from
long-term practice of Tai Chi. Tai Chi has been shown to be successful in reducing falls
among older adults due to its emphasis on control of displacement of body mass, postural
alignment, and muscle strengthening of the lower body (Li, Harmer, Fisher, McAuley,
Chaumeton, Eckstrom, & Wilson, 2005).

Tai Chi, yoga, and specific balance training improve overall physical functioning,
but also help individuals with heart disease, hypertension, and arthritis (Mernitz &
McDermott, 2004). Several studies have shown benefits of Tai Chi for older individuals
As noted above, the ACSM (2014) has no specific recommendations for neuromotor/balance exercise, but they do note that these exercises help in reducing falls if performed two to three times a week. Specific recommendations include doing progressively more difficult stands that gradually reduce the base of support such as moving from a two-legged stand to a semi-tandem stand, to a tandem stand, and finally to a one-leg stand. Three other recommendations include dynamic movements that perturb the center of gravity, stressing postural muscle groups, and reducing sensory input (ASCA, 2014). Their fifth recommendation is to do Tai Chai.

**Barriers to Exercise among Older Adults**

The barriers to exercise that older individuals identify can represent significant realities. Many elderly individuals decide that even moderate PA is too time consuming (Chao, Foy, & Farmer, 2000). These individuals focus on the time to complete the activity along with the time to travel to the activity. Chao, Foy, and Farmer (2000) report that many older adults do not see exercise as necessary for well-being. Instead they see it as a recreational activity. This misconception is perpetuated by medical doctors and health care providers who often give vague directions or recommendations regarding exercise (Chao, Foy, & Farmer, 2000). The main reasons that older adults cite for not exercising fall into several categories including, health, multiple comorbidities, environment, knowledge, efficacy, level of childhood exercise, and physician advice regarding exercise. Each of these reasons is examined below.
Health

Poor health is the most frequently identified reason that older adults cite for not exercising (Booth, Bauman, Owen, & Gore, 1997; Bronson, Baker, Housemann, Brennan, & Bacak, 2001). Booth, Bauman, and Owen (2002) following up on their previous research found that Australian men and women cited different reasons for not exercising with women saying they were too old and men cited injury or poor health. A study conducted by Cohen-Mansfield, Marx, and Guralnik, (2003) with community-dwelling older adults identified the main barriers to physical exercise as health problems and pain. Newson and Kemps (2007) conducted a study with 217 older adults (aged 63 to 86-years of age) where participants rated various motivations and barriers to exercise and found that their findings were consistent with prior studies. Newson and Kemps (2007) also identified gender based differences. Men were more likely than women to be motivated to exercise due to what the male respondents identified as the challenging nature of exercise. Women, on the other hand, were more likely to report health concerns as the main reason they didn’t exercise.

Multiple Comorbidities

A significant reason that older adults give for not exercising is the multiple comorbidities from which they suffer. Comorbidity is the concurrent presence of two or more medically diagnosed diseases in the same individual (Abate, Di Iorio, Di Renzo, Paganelli, Saggini, & Abate, 2007). Fleg (2012) identified the two most common among older adults, arthritis and musculoskeletal disorder that interfere with walking and related activities. The challenge with individuals who have several illnesses is to find an activity that causes minimal to no aggravation to the specific condition (Fleg, 2012). In a 2012
paper on exercise guidelines for adults with type 2 diabetes, Hordern, Dunstan, Prins, Baker, Singh, and Coombes specifically noted that the risks associated with exercise are less than those of inactivity, even for those older adults with multiple chronic diseases.

**Environment**

Bad weather, the neighborhood is not suitable for exercising (no sidewalks, no parks), no good facilities near their home (including the issue of safe facilities), and the expense of exercise are some of the environmental barriers that Rashinaho, Hirvensalo, Leinonen, Lintunen, and Tantaen (2006) found when they surveyed 645 adults between the ages of 75 and 81. This study is significant since it includes a large sample of community dwelling individuals conducted in Finland, which ranks fifth among all countries worldwide in quality of life for older individuals (Economist, 2005).

Chao, Foy, and Farmer (2000) discovered that older adults associate exercise with negative issues such as sweating, labored breathing, and muscle soreness which they sometimes perceive as more harmful than beneficial. Older women said that exercise was not “ladylike.”

Exercising alone or the lack of company is another barrier that many elderly say stops them from exercising (Rashinaho et al., 2006). Interestingly, Rashinaho et al., (2006) found that fear and negative experiences were often reported as barriers to exercise by those with mobility limitations but rarely by those without mobility limitations. Human interaction and the associated positive experiences can become positive motivators to exercise (Garber & Blissmer, 2002).
**Knowledge**

Newson and Kemps (2007) found that women often expressed that a lack of “exercise-specific knowledge” was a factor preventing them from exercising. This was in addition to a “lack of exercise facilities in the area.” A third area reported by Newson and Kemps was that women often stated that they did not know what they were physically capable of doing when exercising. Rasinaho et al., (2006) found that PA is not an easily adopted behavior by older adults, because engaging in it might feel threatening. It takes time and effort to actively exercise and the health benefits might not be immediate (Rasinaho et al., 2006).

**Self-Efficacy**

Self-efficacy has direct influence on an individual’s activities and also on their expectations of success. Self-efficacy appears to be the predominate barrier in older adults as demonstrated in several research studies (McAuley et al., 2011a; Neid &Franklin, 2002). McAuley, Szabo, Gothe, and Olson (2011) state that self-efficacy has been demonstrated to influence a wide-array of health behaviors and is particularly influential in the adoption of physical activity. Self-efficacy is the belief that one is competent and can do whatever is necessary to achieve expected outcomes (Bandura, 1977). It refers to one's beliefs in one’s own ability to successfully perform a specific task and can influence an individual’s choice of activities, effort, persistence, and achievement (Bandura, 1977; Schunk, 1995).

Gill and Williams (2008) note that mastery experience, also referred to as performance accomplishment, has been shown to be the largest influence on self-efficacy
because it is based on actual mastery of a skill. Nichols (1984) notes that the more an individual feels that they have learned or mastered a task, the more competent they feel.

**Childhood Exercise**

Older adult’s attitudes regarding exercise can be developed at an early age. While younger children have a positive attitude towards PA, as they grow older, their perception of physical education becomes ambiguous (Taylor, Blair, Cummings, Wun, & Malina, 1999). A later study (Trudeau, & Shephard, 2005) found that the type, quality and instruction of physical education programs in the school has changed since that of the 1950-1970’s and that those changes have helped to maintain a positive perception among younger adults. This is in contrast to older individuals who consider their physical education program to be sub-par (Trudeau, & Shephard, 2005). It is important to note that Title IX, a portion of the United States Education Amendments, was passed in 1972. It was the first comprehensive federal law to prohibit sex discrimination in education, and increased the exposure of female sports (Boutilier, & SanGiovanni, 1983). Women who attended elementary and high schools after 1972 have had different attitudes regarding PA and sports in general.

**Primary Care Physician and the Patient**

Physicians play a large role in the lives of older adults. Americans average 3.1 visits per year to their doctor (Cherry, Woodwell, & Rechtsteiner, 2007). For older individuals, this number is higher. Yet, the length of time that a physician spends with a patient during an average visit is 9.5 minutes (Cherry, Woodwell, & Rechtsteiner, 2007). Physicians themselves say that lack of time during the office visit prevents them from explaining the benefits of PA to older individuals (Schulzer, & Graves, 2004). Other
factors cited by physicians included limited reimbursement for preventive counseling and their lack of training in exercise physiology (Schulzer, & Graves, 2004). Encouragingly, older adults who do receive exercise advice from their physician perform more moderate to heavy levels of exercise per week than those who do not receive advice (Balde, Figueras, Hawking, & Miller, 2003). The baby boom generation, now numbering over 80 million in the United States (Cohn, & Taylor, 2010), and the passage of the Affordable Care Act that enables more Americans to be covered by primary care physicians (Petterson, Liaw, Phillips, Rabin, Meyers, & Bazemore, 2012) brings another crisis – the adult primary care physician shortage (Petterson, et al., 2012). Older adults over the age of 65 see their primary care physician more than any other age group with the exception of children under the age of four (Petterson, et al., 2012). It is estimated that by the year 2020, the shortage of primary care physician will exceed 40,000 (Bodenheimer, & Smith, 2013) and this shortage affects older adults more than children, in part due to the web of paperwork involved with Medicare (Colwill, Cultice, & Kruse, 2008).

Data from the National Health Interviews Survey indicate that approximately eight of ten adults (individuals over the age of 21) saw a health professional or physician over the past 12 months (Barnes, & Schenborn, 2012). This same survey found that while older adults do seek medical attention, less than half of these individuals received advice from a physician or health care provider regarding PA (Barnes, & Schenborn, 2012). It has been found that 41.6 percent of adults between the ages of 65 and 74 had received some advice from their physician regarding exercise or PA (Barnes, & Schenborn, 2012). The percentage drops to 32.9 for adults’ between 75 -84 years of age and 29.9 percent for adults over the age of 85 (Barnes, & Schoenborn, 2012).
Unfortunately, the data gathered does not provide information regarding what specific advice was provided by the health care professional/physicians nor the amount of time spent with an older individual regarding the specifics of exercise.

Older adults, however, generally perceive that the advice they receive from their physicians regarding exercise is inadequate. Several focus group-based research studies have been conducted with older adults to evaluate how older individuals perceive the advice they receive from their physicians. Weiss, Wolfson, Yaffe, Shrier, and Puts (2012) conducted focus groups with 56 Quebec, Canada residents over the age of 65. The participants were not enthusiastic about physician guidance regarding PA for two reasons. First, some participants did not consider their doctors as “important sources of information or motivation” and second participants did not consider their physicians good role models because of their own health behaviors (e.g., smoking, being overweight) (Weiss, Wolfson, Yaffe, Shrier, & Puts, 2012). A second important finding was from a subset of the 56 participants, specifically those who had had health problems. This group indicated that they were more positive about physician-initiated counseling, reporting that it had helped them to increase their PA level. Participants who experienced health problems and were presented the choice between medication or prescribed exercise indicated that they were more open to physician initiated exercise counseling. However, this study did not follow-through with discovering if the participants had received physician initiated exercise counseling.

A subsequent study by Costello, Leone, Ellzy, and Miller (2013) used three focus groups based on the individual’s level of PA. The 31 participants over the age of 60 all lived independently in a Maryland suburb. Three specific areas regarding PA were
identified by the participants. First, the participants, both those who were physically active and those who were physically inactive, noted the lack of communication or negative communication regarding PA with physicians (Costello, Leone, Ellzy, & Miller, 2013). They identified that their conversations with their doctor lacked substance, that the physicians lacked knowledge of exercise guidelines, or that the physician was not comfortable in discussing exercise. Second, participants considered the physician’s use of PA as a “secondary prevention method” (Costello, Leone, Ellzy, & Miller, 2013). They noted that PA was discussed as a secondary issue only after a pharmaceutical medication had been prescribed or after several visits based on the same situation. One participant noted that only after two heart-attacks and several pharmaceutical prescriptions did the physician begin to discuss PA. Additionally, participants noted that PA advice was usually only provided for pre-existing conditions. Third, participants in the physically active focus group noted that their physician sometimes provided extrinsic motivation with positive reinforcement for PA. Other participants in the physically active focus group noted that they viewed the motivation from their physician negatively or threatening, telling patients that if they didn’t exercise they would be in medical trouble.

Lobelo, Duperly, and Frank (2009) state that physicians and health care providers who themselves are physically fit or who exercise on a regular basis provide both better counseling and motivation to their patients. In 2002, Mayo Clinic physicians and educators, Chakravarthy, Joyner, and Booth, wrote that it is an obligation of primary care physicians to counsel and prescribe PA to prevent chronic health conditions becoming a primary health issue. They specifically said that PA “could be viewed as primary therapy
to prevent other costly therapies.” However, that same year, a study (Garry, Diamond, & Whitley, 2002) indicated that only 13 percent of 102 medical schools in the United States included PA in its curriculum.

Bodenheimer (2012) writes that some primary care practitioners have expanded the roles of nurses, medical assistants, pharmacists, and behavioral health professionals to improve patient access and provide information to patients and follow a wide variety of physician-approved protocols provided that training and supervision is in place. Bodenheimer, Willard-Grace, and Ghorob, (2014) discovered that Kaiser Permanente Southern California Hospitals use medical assistants to review the health maintenance screen in the electronic health records with patients, advise patients of care gaps, and enter orders based on protocols to address the care gaps. At the University of Utah Community Clinics, medical assistants identify and counsel patients needing colorectal cancer screening and, with patients’ approval, place an order for colonoscopy in pending status before the patient sees the clinician (Bodenheimer, Willard-Grace, & Ghorob, 2014). Health coaches, employed by some large organizations, provide information to patients and assist in exercise recommendations and lifestyle modifications. One specific example is at Cabin Creek Health Systems in rural West Virginia, where health coaches visited home-bound and frail elderly patients and connect them with needed services, including physical activity recommendations that have often led to physical therapy and occupational therapy (Bodenheimer, Willard-Grace, & Ghorob, 2014).

In 1992, Dr. Barbara Starfield, a pediatrician and former chair of the Department of Health Policy and Management of the Johns Hopkins Bloomberg School of Public Health in Baltimore, defined the four pillars of primary care practice: first-contact care,
continuity of care, comprehensive care, and coordination of care (Starfield, 1992; Starfield 1998). Since that time, many physicians and medical centers have added and elaborated on her model. Bodenheimer, Ghorob, Willard-Grace, and Grumbach (2014) developed the ten building blocks of high-performing primary care. They took the four foundational elements—engaged leadership, data-driven improvement, empanelment, and team-based care and developed six other key elements including, “The Patient-Team Partnership.” This approach includes physical activity prescription where patients are not told what to do but are part of a shared decision. For patients with chronic conditions, another element, health coaching, provides a system for the individual to be a key part of their self-management support. Bodenheimer, Ghorob, Willard-Grace, and Grumbach, (2014) also indicate that pharmacists and other non-medical personnel are key for better health, improved patient experience, and more affordable costs.

Use of Technology among Older Adults

Older adults are turning to other sources for medical services, including both clinical and nonclinical facilities with licensed and non-licensed practitioners, retail clinics (pharmacies that provide immunization, screenings, and health information), patient self-care, and technology (Bodenheimer& Smith, 2013). Retail clinics have become a common fixture in national drug store chains and “big box” stores, such as Target, CVS, Walgreens, Walmart, and grocery chains and provide basic medical care without an appointment and with short wait times (Bohmer, 2007). They are becoming a favorable way to promote and administer vaccinations to older adults (Uscher-Pines, Harris, Burns, & Mehrotra, 2013).
Telemedicine innovations have aided older individuals with home-based management of pacemakers, diabetes, hypertension, and other chronic conditions (Margolius, Bodenheimer, Bennett, Wong, Ngo, Padilla, & Thom, 2012) as well as providing quicker aid for stroke victims and individuals who live in rural communities (Bashshur, Shannon, Krupinski, Grigsby, Kvedar, Weinstein, & Tracy, 2009).

The Internet has provided new communication possibilities for disseminating information regarding health care, with the potential to change how health care may be delivered in the future (Moorhead, Hazlett, Harrison, Carroll, Irwin, & Hoving, 2013). Older adults have stepped up their use of technology with 58 percent indicating that they use the World Wide Web (Perrin & Duggan, 2015). In 1999, only 14.6 percent of this age group was connected to the Web (NTIA, 1999). For most online seniors, Web use is a daily fixture in their lives. Among internet users age 65 and older, 70% of those who have access use the Web on a typical day compared to 82% of all adult internet users (Zickuhr, & Madden, 2012). Interestingly, the Web is the first source that people turn to for information about health issues (Hesse, Moser, & Rutten, 2010).

Email continues to be the most popular Internet feature for 65 and over adults. Eighty-six percent of those over 65 who use the Internet say they use email, with 48 percent indicating that they use email on a typical day (Zickuhr, & Madden 2012). Besides Internet use, sixty-nine percent of all adults over the age of 65 own and use a cellphone, while 56 percent of adults 76 and older use cellphones (Zickuhr, & Madden, 2012). One-third of those age 65 and over use social networking sites such as Facebook with 18 percent reporting they do so every day (Zickuhr & Madden, 2012).
This level of Internet use by older individuals provides evidence of a firm foundation on which to begin a Web-based repository of information to assist older adults in talking to their primary care physician about PA and exercise prescriptions.

**Exercise Prescriptions**

The role of exercise prescriptions is viewed by several organizations as crucial for healthy aging. Since 1975 (ACSM, 2014) the American College of Sports Medicine has recommended and provided guidelines to physicians and health care professionals to advise their patients on PA. In 2007, the American Medical Association (AMA) and the ACSM co-launched *Exercise is Medicine®: A Global Health Initiative*, a program emphasizing the critical role health care providers’ play in promoting a healthy lifestyle which includes physical activity. Two years later, representatives from international public health, medical associations, and scientific associations requested that ACSM begin a multinational program, which now includes 39 countries in North America, Latin America, Europe, Africa, Southeast Asia, China and Australasia (Lobelo, Stoutenberg, & Hutber, 2014). This initiative focuses on encouraging primary care physicians to discuss physical activity when treating individuals (Lobelo, Stoutenberg, & Hutber, 2014). It also encourages doctors and other health care providers to refer patients to an *Exercise is Medicine®* credentialed program (Lobelo, Stoutenberg, & Hutber, 2014).

The *Exercise is Medicine®* website is specifically designed for physicians and includes a *Health Providers’ Action Guide*. The Action Guide, which is available on their website includes (1) printable PDF flyers appropriate for doctors’ offices that stress physical activity; (2) The Physical Activity Vital Sign (PAVS) questionnaire, and (3) the Physical Activity Readiness Questionnaire (PAR-Q). The latter two are clinical tools
used to screen adults regarding physical activity. There is also an *Exercise is Medicine®* Prescription Pad, which provide exercise guidelines. Recently, a few medical schools have implemented curriculum that focuses on *Exercise is Medicine®*, which was developed by the University of California, San Diego-San Diego State University General Preventive Medicine Residency Program in conjunction with the University of California, San Diego, Exercise and Physical Activity Resource Center and led by the American College of Preventive Medicine (Hill, Nichols, Wing, Waalen, & Friedman, 2015). While Hill, Nichols, Wing, Waalen and Friedman (2015) describe this program, they have no statistical results because this program is so new. Consequently, there are no results indicating its potential for success. All of this coincides with the fact noted earlier that there are only a handful of medical schools and residency programs that offer coursework in clinical applications of exercise science (Mohler, D'Huyvetter, Tomasa, O'Neill, & Fain, 2010).

Rogers, Green, and Rogers (2012) state that older adults need to have an explanation of an exercise prescription and understand how to carry it out. They emphasize that it is just as important to understand the instructions on a medicine bottle as it is to understand the instructions for an exercise prescription. Mernitz and McDermott (2004) define four components of the exercise prescription that need to be explained to older individuals: mode, intensity, duration, and frequency. Mode is the type of exercise. Intensity refers to how fast an action is performed; the power or strength required to perform an activity; or the effort put forth by the participant during the activity. Duration is the amount of continuous time the exercise is done. Frequency is how often the exercise is done in a given week. Rogers, Green and Rogers (2012) add
that an individual’s progress is important to discuss with a physician or health care professional because it is equivalent to how each individual responds to a particular exercise and what further exercise prescription treatment options should be considered.

Reuben and Tinetti (2012) provide an alternative approach to the use of exercise prescriptions. They recommend that the health care provider and the patient establish health goals “within or across a variety of dimensions” such as physical functional status, symptoms, social and role functions, and establishing a plan on how to meet those goals.

The arguments and rationale for exercise prescriptions presented in the research described above makes a clear and compelling case for their use. It is also likely that the number of health care professionals adequately versed in PA and willing to take the time to provide them is limited. This will leave many older adults fighting an uphill battle to obtain accurate and useful information about PA from their physicians. Since consultation with a physician is a key element in assessing the viability of an exercise regimen, the checklists developed as part of this Masters project were conceived as a support element for older adults who find themselves struggling with this task.

**Evaluation of Exercise**

Confirming that older adults actually perform the exercise prescribed is somewhat more difficult than confirming that older adults take their pharmaceutical medications. Self-reporting questionnaires and activity diaries are only reliable for part of the population due to memory and cognition issues (Forsén, Loland, Vuillemin, Chinapaw, van Poppel, Mokkink, & Terwee, 2010; Harris, Owen, Victor, Adams, Ekelund, & Cook, 2009; Theou, Jakobi, Vandervoort, & Jones, 2012). There are however several objective measures of PA such as pedometers, accelerometers, heart rate monitors, GPS, and
energy expenditure measures (Forsén, Loland, Vuillemin, Chinapaw, van Poppel, Mokkink, & Terwee, 2010; Spierer, Rosen, Litman, & Fujii, 2015). While pedometers are relatively inexpensive, they measure step count but they do not measure intensity and do not differentiate walking speeds (Harris, Owen, Victor, Adams, Ekelund, & Cook, 2009). Accelerometers measure the body’s acceleration in one or more directions and are more often used in a research setting. In recent years sport companies have been making devices (e.g., Fitbit) and watches for runners that include accelerometers to help determine the speed of and distance traveled by the individual wearing them. These commercial devices are usually somewhat expensive ($100 and up). Some of them connect to the Web to store a history of an individual’s efforts.

Munson and Consolvo, (2012) studied the use of mobile devices and social software that can help people manage the progress of their physical activity. An example is software programs that allow individuals to establish goals, self-report, and receive virtual stickers and badges for achieving their goals. Their study included 23 younger individuals who were tech savvy. Those who found the software useful said that establishing primary and weekly goals and posting them online made them more likely to adhere to their exercise objectives. There have been no published findings on older adults’ use of this new type of software.

Self-reporting has always been a way of assessing whether or not individuals fulfill their exercise regimen. Daily, weekly, and monthly schedules are printed and available via the World Wide Web. The downfall of this is that individuals will forget to report, don’t report accurately, or over-inflate the amount of time they worked out.
In the end, evaluation of an older adult’s progress with an exercise regimen will depend heavily on the interest and diligence of the involved healthcare professional—along with the availability of easily used paper or computer-based reporting forms. For those who can afford them, the Fitbit-like devices will provide a limited but objective assessment for which a history can be maintained and reported.

**Summary and Conclusion**

Research examining exercise continues (Garber et al., 2011) to show that PA provides an increased quality of life and positive aging. Aging is a universal experience resulting in significant changes in the individual that also impacts society as a whole. The issue of physical fitness among those over the age of 65 is important to the individual and their family members as well as being a necessary element of public policy discussions in the United States.

For individuals who have exercised little in their lives, changing behaviors is difficult. Participation in PA has been shown to enhance life quality into advanced old age. PA slows the aging process, improves strength and stamina and reduces some of the degenerative diseases and chronic illnesses associated with aging. PA not only improves physical issues, but also has been shown to reduce depression and anxiety. In the end, exercise helps individuals maintain their ability to live independently and reduce their health care costs.

For those older adults who do want to exercise, a real issue is how to acquire a safe and appropriate exercise program. Their initial questions are often directed to their physician or a health care professional. However, since only 17 percent of all medical schools provide instruction in physical fitness and activity, the majority of physicians
have little experience providing an exercise prescription. And, since the average time a
doctor spends with a patient is 9.5 minutes this further reduces the time to explain well-
care and PA in comparison to diagnosing an immediate medical problem.

One possible solution to this dilemma is providing older adults with a PA
checklist or questionnaire that they could use with their doctor. This would help them
begin the discussion in a more knowledgeable and efficient manner making them an
integral part of the patient-team partnership as described by Boenheimer et al., (2014). In
instances where time constraints prevent actual discussion, the physician might quickly
review the checklist-questionnaire and refer the individual to another health care
professional or exercise physiologist. In either case the potential for creating an exercise
program has increased.

These checklists will be made available on a publically accessible website and
will be based on the ACSM guidelines. As described above the checklists will be created
for older individuals with the specific objective of review with their primary care
physicians. The website created to distribute the checklists will be tailored for older
individuals. It will include instructions for basic exercises in each of the four exercise
groups. Testimonials and examples by older adults will be posted on the website for all
participants to read. The intent will be to positively impact some of the barriers that
seniors encounter to PA with peer-based information. Suggestions and recommendations
for inexpensive ways to acquire physical activity and its evaluation will also be included
as well.

While medical professionals and health care providers may understand the benefit
of exercise, the issue remains that they are not prescribing it very often. And if they are
prescribing it, they are not providing information that will allow older adults to successfully participate and reap the benefits from the PA. It is the goal of this pilot website to provide a concrete mechanism that will assist older adults with obtaining answers to their questions about exercise and PA from their healthcare professional.
CHAPTER THREE

PROJECT DEVELOPMENT

This project has two primary objectives. The first is to develop checklists that will facilitate older adult’s communication with healthcare professionals regarding PA prescriptions. The second is development of a website, http://kick60.com, which will make the checklists available to the public. The following two sections describe how each of these products has been developed.

Checklist Development

The *ACSM’s Guidelines for Exercise Testing and Prescription*, 9th Edition (2014) is considered *the bible* for information regarding exercise prescription. As noted in Chapter One it is the most extensively used reference among similar documents. The ACSM Guidelines were first established in 1975 and have been updated every four to six years (ACSM, 2014). The document consists of 11 chapters divided into three main sections: Health Appraisal and Risk Assessment, Exercise Testing, and Exercise Prescription. Over 50 authors, including medical doctors, health professionals, academics, researchers, pharmacists, and physical therapists, have contributed to the work with 20 plus health professionals and academics conducting reviews of the content. The focus of the ACSM Guidelines is on the clinical application of exercise, testing, and health screening along with exercise prescription including considerations for specific illnesses. According to Google Scholar, the book has been cited 22,100 times in academic journals over the course of 15 years, providing evidence of extensive use in exercise physiology.
The ACSM’s Guidelines for Exercise Testing and Prescription has served as the foundation for the development of the checklists that will facilitate communication regarding PA prescriptions. Specifically, section three of the ACSM Guidelines, Exercise Prescription, provides the core checklist material. In this section, structured by type of exercise, recommendations are presented for duration, repetitions, sets, frequency, and velocity. There are also additional recommendations for older adults and those with chronic diseases and other health conditions.

The checklists have been developed in Microsoft Word before conversion to the portable document format (PDF) that will be accessible from the website. Each checklist will be composed of four sections. The first provides a bulleted overview of the exercise type or the health condition that is the topic of the checklist. The second section presents, in table-form, the guidelines for the checklist topic. The third section presents the checklist itself. This section is structured and formatted in a manner that can be easily completed during discussion with a physician. The items in this third section have been tailored, in part, based on the recommendations from the ASCM Guidelines, along with peer reviewed articles. The last and fourth section of the checklist is a list of references that provide additional information about the checklist topic. Zulman, (et al., 2011) found in a phone survey conducted with 1450 older adults that web pages which clearly identified the source and established the credibility of the information had increased levels of trust, and older adults tended to use that website more often. Kick60.com will leverage this finding by providing citations that will establish the source and credibility of the information presented.
Checklists have been developed for each type of exercise, endurance, resistance, strength, and balance, and are intended to support the initial discussions with a primary care physician or other medical professional. Because they are targeting initial discussions these checklist may appear to be relatively simple and straightforward. However for an individual who is (a) speaking to their doctor for the first time about an exercise prescription and/or (b) beginning to exercise after little exercise in the past, they will hopefully strike the correct balance between complexity and providing useful and easily consumed information. If an older adult has been exercising, these guidelines can be used as a check-up regarding PA and may lead to further discussion with a physician regarding other issues, including but not limited to additional health screening, and increasing PA or modifying PA.

Other more complex checklists have been developed to support exercise prescriptions for individuals with (a) Type 2 diabetes, (b) issues regarding fall prevention, (c) arthritis, (d) osteoporosis, (e) weight reduction goals, (f) pulmonary disease and (g) restless leg syndrome. Over time (not part of this immediate project), the prescription checklists will be expanded in two ways that are directly related to their distribution on Kick60.com. First, it will be possible for individuals to communicate via email with the website administrator and ask for information on specific conditions. When possible and appropriate, a checklist will be added to the website to support such requests. Secondly, as time and funding permit, the site administrator will continue to work on the issues of prescription exercise. Additional checklists will be created building a larger database of information.
Website Development

The website, http://www.kick.60.com, has been launched to serve as the vehicle which will distribute the exercise prescription checklists to the public.

Kick60.com combines the traditional website components of text, photos, and video with short user generated stories regarding exercise programs. As described above, the main focus of the website is to provide exercise prescription checklists that older adults can use in discussing exercise with their physicians and health care professionals. Anecdotally, when the search term *exercise prescription* was used in the Google search engine it returned over five million results. While, all five million search results were not examined, little could be found on the resulting websites other than general information such as, “talk to your doctor before exercising” or specialized information using technical terms not written for the consumer. In addition, users of the Kick60.com will learn about the four types of exercises; endurance, (aerobic/cardiorespiratory), strength (resistance), flexibility (stretching), and balance (motor skills). These four terms were selected based on the competitive analysis (see Chapter Four) showing that websites focusing on older adults and exercise tend to use these terms instead of others. These terms are easy to understand and appear to be the general terms that health care professionals understand.

Site Map

The initial launch of the website is scheduled for December 2015, with additional material and changes in updates and versions to be completed at later dates. The site map of the initial website is shown in Figure 1 below. The elements in this site map will comprise the main menu of Kick60.com which will always be found at the top of the website.
The highest level in the site map hierarchy will be implemented as a continuously visible main menu. The lower levels will be implemented as dropdown menus that will
be visible when hovering over the appropriate higher level menu element. Each of the
top level items in the main menu will be discussed in the paragraphs below.

**Talk to Your Doctor**

The most important and substantively different feature compared with other
health and exercise websites is the Kick60.com section entitled, “Talking to Your
Doctor.” In this section, users will access a series of checklists that they can print and
take to their doctor, or health care professional to discuss exercise prescription. The first
four checklists developed will be one each for endurance, flexibility, strength and
balance. Each of these four checklists can be used for the initial discussion with a health
care professional. In a later version of the website, each of these types of exercises will
have a second checklist that can be used on subsequent visits. Other exercise prescription
checklists will be added in subsequent versions of the website including those targeting,
Parkinson Disease, Fibromyalgia, back pain, and pulmonary disease. As the website
develops and new features and versions are implemented, it is hoped that users will
request checklists for specific exercises and disease conditions. Those prescriptions will
be developed using various resources including *ACSM’s Guidelines for Exercise Testing
and Prescription*, with additional material from content-specific sources such as the
American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR)
recommendations for individuals with cardiovascular disease (ACSM, 2014; Yancy,
Jessup, Bozkurt, Butler, Casey, Drazner, & Wilkoff, 2013). As noted above, each
checklist will have a list of citations. All checklists will include a link to *Exercise is
Medicine ®*, a website developed by the ACSM for health care providers and exercise
professionals to help them in creating exercise prescriptions.
**Exercise**

Each of the four types of exercises will be represented under the Exercise main menu item and will have identical submenus. The six elements in these identical submenus will include:

- The **Benefits** section providing information on the benefits of each exercise type;
- The **Guidelines** section showing the ACSM Guidelines for that specific exercise type;
- The **Exercise** section will include specific exercises and instructions on how to do them correctly and safely. Some of the exercises will have animation; others will have video demonstrations while others will be written instructions. This section will be expanded over time.
- The **Schedule** is a recommended schedule of how often to perform the exercise each week, along with duration, and when needed reps, the number of times the exercise needs to be performed, and sets (the number of cycles of reps that should be completed).
- The **Activity Log** is a printable PDF document in which individuals can record their weekly physical activity. Due to coding complexity, an online form that users can use to maintain all of their weekly records is not feasible at the present time.

**Stories**

From the very beginning of Kick60 planning, the Stories section was always an important part of the concept. After the competitive analysis discovered that another website, [http://nihseniorhealth.gov](http://nihseniorhealth.gov), included this feature we will ensure that Kick60 does
not duplicate but rather adds to the story concept and human interest element of the Web. It is highly unlikely that the two websites will be competing with each other; rather Kick60 will be complimenting much of the material on the government website. The Story section includes a photo of the individual telling the story, along with a brief description of what the individual does for exercise. The individuals’ first name, age, and state will be listed. Each person who completes a story must sign a release form indicating that permission has been given for the material to be displayed on the website. In addition, the release form will include information on how to contact the Kick60 administrator in case they want their information removed from the website. Story participation will be solicited through the website using Internet technology to facilitate the posting and collection of written and photographic/video materials. Eventually social media will be used to help generate stories.

**FAQ**

FAQ is an acronym for Frequently Asked Questions. Example questions that might be included in this section are: “What is the difference between exercise and Physical Activity?” or “Can I exercise too much?” Other FAQs will be developed over time and as users interact with the website and request additional information. The tab-based design of the FAQ section will allow for a well-organized and accessible presentation of the FAQs no matter how many there are or the eventual content.

**About Us**

The About Us section includes Contact Us and Our Leadership as subsections. These subsections will be expanded as needed. The intent of this section of the site will
be to provide information about the producer/developer of this web project and an email link to the principal researcher and web developer of the site.

**Search**

A search box will be a persistent element on all pages of the site so users can easily locate information by typing in their query. The integrated MySQL database makes this feature possible with minimal software development.

**Photos/Videos**

At launch, the majority of the photos will be purchased from stock photo houses. As the site develops, photos will be taken by individuals and added to the site. All original photos used on the website will have release forms and be copyrighted by Kick60. A later version of the site will include exercise videos and exercise instructions. These videos will be shot and edited, with all participants signing release forms. The edited videos along with the original footage will be the sole property of Kick60 unless otherwise stated in the release form or Work for Hire forms.

**Links**

There are two types of links to other websites, hypertext links and framing that will be used on the Kick60 site. A hypertext link is an active element on a webpage represented by a word or phrase that when clicked takes the user to an external web page or a new window. Currently, most copyright lawyers indicate that permission is not needed to hyperlink to an external resource. However, due to the scientific nature of this website, a Linking Agreement will be made with other websites to which Kick60 will link. These Linking Agreements will be kept on file with the site administrator of Kick60. The second type of link, framing, occurs when the external information is
imported from its original source and displayed in a special frame or window on Kick60. As a precaution, Linking Agreements will also be executed for any external resource that is displayed with a Frame on the Kick60 website.

**Software Development**

Kick60.com is being developed using the WordPress content management system as the foundation. The Kick60 specific elements of the site have been created using a customized WordPress theme created by MudThemes. The WordPress software is cost-free and is maintained by a stable open source project. Its flexible structure and compartmentalized architecture allows easy changes to the site. WordPress is based on PHP, a server-side scripting language, and MySQL, an open-source relational database management system. WordPress uses HTML, Cascading Style Sheets (CSS), and JavaScript to create the final presentation that is viewed in the user’s browser. One of the advantageous of WordPress is that it comes with an integrated database eliminating the initial need for a data-base programmer. Through the use of responsive code, WordPress, in conjunction with our customized theme, will support a wide range of devices (desktop computer monitors to mobile phones) with a minimum of resizing, panning, and scrolling.

**Accessibility**

This website will follow the Americans with Disability Act Guidelines for web development (Americans with Disabilities Act, 1994). The Americans with Disabilities Act (ADA) of 1990 requires that U.S. programs and services be accessible to individuals with disabilities. A 1996 Department of Justice ruling (Patrick, 1996) makes it clear that ADA accessibility requirements apply to Internet resources. Future versions will also be accessible through screen readers.
Conclusion

The fast pace of change that we currently experience in online resources will likely continue and digital technology is almost certain to be a major part of our future. Digital technology will hopefully improve health care on many levels. Digital health tools ranging from websites to portable diagnostic technologies are transforming the health care system, again hopefully for the better. Digital technologies are allowing the consumer to be a partner in their care along their physician by providing the information making this possible. As described in Chapter Two, health care costs are going to escalate. It is crucial that individuals are aware of low cost prescriptions such as exercise that can aid in a healthier life. Kick60 will be one among many that older consumers can use to find information about health issues. However, at the present time, as demonstrated by the competitive analysis (see Chapter 4), it is the only one that has exercise prescription checklists to use during discussions with health professionals.
CHAPTER FOUR
COMPETITIVE ANALYSIS

A detailed examination of web-based information related to exercise prescriptions is beyond the scope of this project. Google returns 5,320,000 results for the query string *exercise prescription*. When the word *older adult* is added to the previous query string there are 957,000 results returned. In lieu of examining this voluminous set of data a competitive analysis of selected health related and exercise websites has been conducted. The objectives of this analysis were two-fold. The first was to discover what information regarding exercise prescriptions is readily available to older adults. Second, was to discover if there are any websites that offer checklists or discussion questions that can be used by older individuals to facilitate discussions with medical personnel regarding physical activity. The competitive analysis discovered a variety of information regarding exercise targeted at older adults, including pages that suggested general topics for physician discussions regarding PA. However, there was no website that offered specific prescription exercise checklists for individuals to use while speaking to health care professionals about exercise. The competitive analysis was completed using four government health organizations, 14 major medical centers in the United States that include both hospital and research facilities that have or are closely affiliated with medical schools, the three largest group health portal organizations, three national chain health clubs, two other organizations that focus on older adults and the *Exercise is Medicine* ® website.

Each of the selected websites was analyzed using eight criteria including (1) organization’s name, (2) URL, (3) does the website have exercise information for older
adults, (4) does the website have information on talking to a doctor regarding physical activity, (5) does the website have exercise prescription information, (6) does the website have exercise videos, (7) does the website have exercise instructions, (8) what specific terms does the website use for the types of exercise, and additional notes and observations.

**Results of the Competitive Analysis**

The detailed results of the competitive analysis are presented in tabular form in Appendix A where the eight analysis criteria are presented in the columns of the table. A summary of those results are presented below.

The three websites that offered the most useful information for older adults were https://go4life.nia.nih.gov, http://nihseniorhealth.gov and http://www.mayoclinic.org. The first two websites are government websites, providing information from various government agencies and likely have large staffs and outside contractors, providing both software support and content. The third website is part of the Mayo Clinic based in Rochester, Minnesota with facilities in Jacksonville, Florida, and Phoenix, Arizona. Its focus is medical care, research, and education. In addition to the Mayo Clinic, this world renowned organization owns and operates the Mayo Clinic Health System, consisting of more than 70 hospitals and clinics across Minnesota, Iowa, Wisconsin and Georgia. Mayo Clinic also operates several colleges of medicine, including Mayo Medical School, the Mayo Graduate School, and the Mayo School of Graduate Medical Education, and Mayo School of Health Sciences (Mayo, 2014).

The Go4Life website is part of an exercise and physical activity campaign conducted by the National Institute on Aging which is part of the National Institutes of
Health (NIH). Using this website, individuals can order what is termed Free Stuff including an exercise workbook, an exercise DVD, an audio book, along with printed material in both English and Spanish, which are all available free of charge. The website has a larger type font and appealing photographs of older individuals. The Go4Life site provides exercises in the four categories, endurance, resistance, flexibility, and balance, with a large number of exercise videos and exercise instructions. The site provides excellent information on the four types of exercise as well as demonstration videos and coaching tips. Material from this website has been used by some research studies (Thompson, Kuhle, Koepp, McCrady-Spitzer, & Levine, 2014). In November 2015, the San Mateo County Health System, San Mateo, hosted free workshops, using the Go4Life web material to promote PA among older residents of the community (Lo, 2015).

The NIH Senior Health website was developed by the National Institute on Aging (NIA) and the National Library of Medicine (NLM) both part of the NIH. It is an easy to navigate website, with a large index of articles on health topics, exercise videos, and individual’s exercise stories. This website has one feature that is especially enticing called Exercise Stories. Adults over the age of 60 are encouraged to send stories about their exercise regimen. The stories include a photo and age of the individual. When they submit stories they are asked to complete an online form giving the National Library of Medicine permission to use and disclose the information submitted to the website. According to the website, this page Exercise Stories was last updated in 2009. There is one page on the site, http://nihseniorhealth.gov/exerciseandphysicalactivityhowtogetstarted/safetyfirst/01.html.
that presents issues that address *when to check with your doctor* regarding PA, but it does not discuss exercise prescriptions.

Two other government websites are of note, even though they are not as focused on consumer information. The first is at the National Institute on Aging (NIA) (https://www.nia.nih.gov) which prides itself as noted on its home page as being “The Leader in Aging Research.” NIA is one of 27 Institutes, Centers and Divisions of the U.S. National Institute of Health. The website offers information on the aging process, age related diseases, and special problems and needs of the aged. The institute disseminates information and communicates with the public on health and research advances. NIA is the primary Federal agency supporting and conducting Alzheimer's disease research. The useful page on the NIA website is, *Doctor-Patient Communication* (https://www.nia.nih.gov/health/featured/doctor-patient-communication), and has information about choosing a doctor, hospital hints, considering surgery, medicines, but no specific information that addresses exercise prescription. The second website of note is at the National Library of Medicine. This website has a page entitled, *Talking with your Doctor*, (https://www.nlm.nih.gov/medlineplus/talkingwithyourdoctor.html) which has some information available in a variety of languages, including Arabic, Chinese, French, Hindi, Japanese, Korean, Russian, Somali, Spanish, Ukrainian, and Vietnamese, a feature which few websites provide. As with the NIA site, there is no specific information on exercise prescriptions.

Fourteen websites from hospitals and medical schools were included in the competitive analysis, and as suggested above, the Mayo Clinic site has the most consumer friendly functions. From a web design perspective, the Mayo Clinic site is
consistent throughout. Each page is designed in a similar fashion and the navigation is easy to use. Information is written in a lay person’s terminology, with many pages on older adults and PA under a section entitled, Healthy Aging. There are exercise instructions (e.g., http://www.mayoclinic.org/healthy-lifestyle/fitness/multimedia/balance-exercises/sls-20076853?s=1) and many exercise videos. A search of the site found 1190 exercise videos available for viewing.

The Mayo Clinic site has several navigational tabs ranging from Patient Care and Information to Jobs at Mayo. The Patient Care and Information has a number of subsections including Healthy Lifestyles (which includes two pages on Healthy Aging), Symptoms A-Z, Disease and Conditions, Tests and Procedures, and Drugs and Supplements. A page entitled Exercise: When to check with your doctor first (http://www.mayoclinic.org/healthy-lifestyle/fitness/in-depth/exercise/art-20047414) provides a general discussion of talking to your doctor about physical activity, but little about specific issues.

Cleveland Clinic in Cleveland, Ohio, http://my.clevelandclinic.org/ has a website similar to that of the Mayo Clinic. A unique feature of the Cleveland Clinic site is their health chats. These are once or twice a week podcasts where individuals can submit questions for the online participants to discuss. Reviewing the transcripts on the website of chats done over the past four years, there were no chats regarding older adults and exercise. The only podcast for older adults was termed End of Life Care. There was chats on teenagers and physical activity, including issues regarding concussions, pediatric sports injuries, and sports nutrition (http://my.clevelandclinic.org/health/transcripts). The
site has one webpage entitled *Exercise Guidelines for Seniors* which provides general information but nothing specific about exercise prescriptions or talking with a physician.

Health portals, such as those developed by Kaiser Permanente (https://healthy.kaiserpermanente.org/html/kaiser/index.shtml), Group Health Cooperative (https://www.ghc.org/) and the Veterans Affairs Healthcare System (http://www.va.gov/health/) all provide a wide array of excellent health information as well as secured sections to make appointments and review your medical records. Among the practical benefits such as scheduling appointments online, online resources may be used to connect patients with their health care providers through a secured and private email server as well as connecting with other medical information to provide resources (McAlpine, Joubert, Martin-Sanchez, Merolli, & Drummond, 2015). Kaiser Permanente conducted an email study in 2009 with 4,560 responses with more than 87 percent of respondents over the age of 65 indicating they were satisfied or very satisfied with *My Health Manager* on kp.org (Kaiser, 2009). But this portal, as well as the other medical health portals, provides little if any information about exercise prescriptions or discussion with your physician regarding PA.

Websites from major health clubs, including the three largest, based on revenue, in the United States, (Goldman, 2014) were included in the competitive analysis. Not surprisingly, the main agenda of these websites was to sell memberships. Members can sign-in and authenticate to receive additional information. An important thing to note for older adults is that many health clubs honor the Silver Sneakers program. This is a program for older adults, available through an insurance benefit included in more than 65 Medicare health plans. Through Silver Sneakers, health plans and group retirement plans
provide a gym membership to their insured, usually at no additional cost. None of the health club websites provided information on discussing issues with your physician or a health care professional prior to exercising.

AARP.org is the website for AARP, formerly known as the American Association of Retired Persons, a membership organization for people age 50 and over. The organization is a non-profit advocacy group, with 39 million members, and is one of the most powerful lobbying groups in the United States. The IRS classifies AARP as a 501(c)(4) non-profit that can lobby for legislation. According to a 2001 article in the New York Times (Holmes, 2001), AARP's annual budget of $435 million is about three times the size of the National Rifle Association's. Its website has a myriad of articles ranging from car insurance to health advice. AARP's Active for Life (AFL) campaign focuses on getting sedentary midlife and older adults to engage in moderate physical activity for at least 30 minutes a day, at least five days a week. The web pages are difficult to find on the AARP site and do not offer specific information about talking to one’s doctor regarding physical activity.

YMCA.net is the national website for the YMCA which has more than 2700 branches in the United States. Informally known as The Y, they offer programs and services focused on youth development, healthy living, and social responsibility. The national website offered no information for older adults. However, randomly checking local Y websites such as the West Valley YMCA in Reseda, California, there were specific exercise classes for older adults, but no information on exercise prescription or speaking with physicians.
The final website that was included in the competitive analysis is in reality the reverse concept of what Kick60.com proposes. *Exercise is Medicine®,* an initiative by the American Medical Association (AMA) and the American College of Sports Medicine (ACSM), strongly recommends that healthcare providers assess and review patients’ physical activity at every visit, with a subsequent exercise prescription for individuals to take away with them. The website provides a Healthcare Provider Action Guide which includes many tools to help in exercise prescription. Several checklists along with standardize questionnaires that are used by the medical profession, researchers and academics in developing research programs are part of the Guide. Articles on specific diseases and illnesses highlight the type of exercise a physician could potentially recommend to patients. Whereas Kick60.com provides checklists for older adults to use when talking with their doctor, *Exercise is Medicine* provides information for doctors to talk to patients about physical activity.

In summary, the 24 websites examined in this competitive analysis provide high-level, general information about older adults and exercise. A few go further by providing exercise descriptions and demonstration videos. None however offer anything similar to an exercise-specific or disease-specific checklist that would facilitate a patient-physician discussion regarding exercise. In this regard, while acknowledging the selective nature of the competitive analysis, it would appear that Kick60.com has the opportunity to provide something new and unique that may enhance the PA of older adults in a safe and useful manner.
CHAPTER FIVE

NEXT STEPS AND EXPECTED RESULTS

A rigorous and evaluated implementation of the exercise prescription checklists and the Kick60 website are outside the scope of this Masters Project. However a series of highly probable next steps will allow a set of expected results to be anticipated. The two sections in this chapter will described the next steps that will lead to the anticipated outcomes.

Next Steps

Initially, the exercise prescription checklists will be sent to individuals via email and group mailing lists as a PDF. All emails will include a link to the Kick60 website. The first group of individuals who will receive these emails will be members of California State University, Northridge (CSUN) Association of Retired Faculty (ARF). The author is a member of this organization and has spoken to the group regarding this project at various functions. ARF members have expressed interest in the project, especially the exercise prescription checklist. While some of them are physically active, others are not. Those who are physically active have indicated that they would like to have a more in-depth discussion with their doctor, health care provider, nutritionist, and in one situation, with their physical therapist. They anticipate that having checklists would enable them to move the conversation of PA into a new arena, which would enable them to do more exercise and increase their level of mobility.

For over fifteen years, this author has worked with several organizations including OneGeneration, an organization based in Reseda, California, which provides services to older adults. Part of their mission statement emphasizes that they embrace healthy aging.
The organization has a Senior Enrichment Center and invites speakers to discuss topics of interest. As part of their program, the author will offer to present a program on exercise prescription and explain the use of the checklists at a seminar.

Other organizations to be contacted include senior citizen centers in the San Fernando Valley area of Los Angeles, church-based senior groups, and professional organizations all of whom may have interests in health issues. As an example, the author is on the Board of Directors of the Alliance for Women in Media, a national organization dedicated to advancing the impact of women in the media. Their focus for January 2016 is *A New Year, a New You* with several workshops on various aspects of health and career issues. I will be presenting a seminar on this project. And while the majority of the people in this group are not over the age of 65, they have expressed interest in this for two reasons; (1) some have indicated that they do not exercise and would like to discuss this with their doctor and would use the checklists, and (2) others have parents over the age of 65 and are concerned about their well-being and have indicated that they would pass these checklists on to their parents. It is hoped that CSUN’s *100 Citizens*, a program for adults launched in 2011 by the Kinesiology Department to provide opportunities for exercise in low-income neighborhoods, will also use the exercise prescription checklists.

The final venue for distribution of the checklists is the Kick60 website. By leveraging the power of social media marketing, initiated through the organizational contacts described above, the number of individuals who will become aware of the website will increase. These individuals will be encouraged to view the materials on the website, download the checklist and use it when they see their doctor.
Once individuals start using the website, they will share it with their friends. Friends can often be a strong motivator in PA. As noted in Chapter Two, one of the barriers for PA is exercising alone or the lack of company (Rashinaho et al., 2006). Human interaction and the associated positive experiences can become positive motivators to exercise (Garber et al., 2002). If older adults share these exercise prescriptions with each other, hopefully they will begin to exercise with each other.

While no formal evaluation has been included as part of the launch of Kick60, there are plans to include this in a future version. Through web-based survey applications such as SurveyMonkey, surveys will be conducted with users to determine if the checklists were helpful and determine any modifications that should be considered. The initial cost of SurveyMonkey is $26 a month which would allow up to 1,000 users to respond.

Through the use of Google Analytics, the traffic at the Kick60 website can be examined. Through this software application, the number of unique users, along with how long they spend on the site and what pages they visit, can all become analyzable data. Through the Google Analytic Event Tracker we will be able to see how many people downloaded the exercise prescription checklist and Activity Log. This software will make it possible to see if one exercise prescription checklist is being viewed more often than others. All of this will produce information that will guide improvements implemented in future versions.

As of February 2012, one-third of Internet users age 65 and older used social media networking sites, such as Facebook and 18 percent did so on a typical day (Zickuhr, & Madden, 2012). A number of research projects are being developed using
information and communications technology to facilitate older adult’s participating in social media websites (Leist, 2013). One example is the project Third Age Online project, funded by the European Ambient Assisted Living Joint Programme, aimed at funding research for new technologies to socially connect older adults (van den Broek, Cavallo, & Wehrman, 2010). Leist (2013) surveyed the literature from July and August 2012 on social media use from a gerontological perspective. Leist (2013) reports that from a practitioner’s perspective, social media is used to advance health related knowledge including information on prevention, diagnosis, and treatment of specific conditions. This makes social media one of the high priority methods for Kick60 to attract new users and further expand its reach.

**Expected Outcomes**

The fact is that older adults do not get enough PA. If their level of PA increased they would live longer, have better control of their chronic diseases, and generally age in a more positive manner. Anything that can reduce the barriers that older adults encounter when trying to increase their level of PA will be a benefit to individuals, cohorts such as the baby boomers, and society in general.

The checklists have been designed to target barriers encountered when interacting with a primary care physician about exercise. In this regard, the literature review (see Chapter Two) identified three such barriers. First, older adults who receive advice from a physician about exercise increase their PA as compared to those who do not get physician advice. Second, less than half of older adults, as they continue to decrease in age, actually receive physician advice regarding PA. Third, older adults who actually pursue physician advice often perceive the advice as inadequate. The checklists will address the
first two barriers by providing older adults with a tool that will increase the probability that physician discussions will occur. They will address the third barrier in two ways. First, by providing the older adult with a set of background information that will help them better understand the advice that they do receive. Second, the checklists provide a convenient paper-based format that will reduce the time required for the physician to provide useful advice.

The next steps described in the previous section of this chapter are the vehicles that are going to get the checklists into the hands of older adults reducing the barriers to physician discussions and finally leading to an increased level of PA. If it works as anticipated, Kick60 will be the foundation that provides older adults with a program for potentially a healthy and safer life.
CHAPTER SIX

CONCLUSION

The health benefits received by older adults who participate in PA are well documented. Those who participate in even moderate levels of PA have been shown to reduce their risk of dying from heart disease and they better manage chronic diseases such as diabetes and hypertension. Despite the almost inarguable conclusions from a large body of recent research and attempts to publicize these conclusions, many older adults remain inactive. There are a variety of reasons for this continued inactivity that were discussed in Chapter Two. One reason that was not previously discussed is cost. Older adults may not use personal trainers or belong to health clubs due to the cost, especially when they are living on a fixed income. However, there are many community centers, senior citizen centers, libraries, and other organizations that offer free classes. If older adults, through the use of the checklists, know what exercises are appropriate for them, they just might start using some of these no-cost facilities, thus reaping the benefits of an increased level of PA.

We do know that older adults see their physician more than any other age group, with the exception of those four years of age and under. If these adults could begin a dialog with their physician or even with other individuals (medical personnel, grandchildren, and friends) regarding PA, it may help some of them to begin a PA program. Again, the checklists are intended to facilitate these interactions in a way that will allow all older adults to reap the benefits of increased levels of PA.

Over the past few years, there has been a huge push by Michelle Obama, the First Lady of the Unites States, and her Let’s Move campaign, which encourages children to be
physically active, both in and out of school and to create new opportunities for families to exercise together. This campaign has stepped beyond children and now encompasses adults, moving beyond grade schools and high schools and into the communities. Public officials and community leaders are beginning to promote PA by providing more equipment in parks for both children and adults and encouraging their citizenry to get active. Taking advantage of this recently invigorated public sector initiative makes the checklists and Kick60 even timelier. Now really is the time to get older adults more involved in PA.
REFERENCES


Barnes, P. M., & Schoenborn, C. A. (2012). Trends in adults receiving a recommendation for exercise or other physical activity from a physician or other health professional. US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics.


APPENDIX A

COMPETITIVE ANALYSIS

A summary of the results of the competitive analysis is presented in Chapter Four.

Table 1 in this Appendix presents the detailed results from 27 websites that focus on health and medical issues. The analysis included four government health-centric agencies, 14 major medical centers that include hospital and research facilities, three national health clubs, the three largest group health portal organizations, two additional organizations for focus on older adults, and the *Exercise is Medicine*® website.

The information presented in each column of Table 1 is as follows:

Column One – Organization

Column Two – URL

Column Three – Exercise Info for Adults

Column Four – Information on Talking to Doctor

Column Five – Exercise Prescription

Column Six – Exercise Videos

Column Seven – Exercise Instructions

Column Eight – Exercise Terms

Column (Full Column below top one) – Additional Notes

Table 1. Competitive Analysis Results

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<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>National Institute to Health</td>
<td><a href="http://www.nih.gov/">http://www.nih.gov/</a></td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Few</td>
<td>Few</td>
<td>Endurance Strength Balance Flexibility</td>
</tr>
</tbody>
</table>
Where to Find Exercise Information:
- First Navigation Tab: Health Information/Talking to Doctors.

Where to Find Information on Talking to your Doctor
- Power Point presentation on “Talking to Your Doctor.”
- Many articles on “Talking to Your Doctor” – most about illnesses and treatment plans.
- Articles that have exercise involved note that you are to “Talk to your doctor before beginning to exercise.”

Where to Find Exercise Prescription:

Exercise Videos:

Exercise Instructions:

General Information:
- Much of the material can be read in Spanish. Several videos on “Talking with Your Doctor.” One regarding falls. One regarding Balance. Sixteen videos on Exercise and Physical Activity for Older Adults.
- Videos come from a variety of sources, so no consistency.
- Good website for information. No checklists for prescription exercise.

<table>
<thead>
<tr>
<th>National Institute of Health Senior Health</th>
<th><a href="http://nihseniorhealth.gov/">http://nihseniorhealth.gov/</a></th>
<th>Yes</th>
<th>Yes</th>
<th>No</th>
<th>Yes</th>
<th>Yes</th>
<th>Endurance Strength Balance Flexibility</th>
</tr>
</thead>
</table>

Where to Find Exercise Information: Health Topics A-Z -Second Tab.
- Exercise: Benefits of Exercise
- Exercise: Exercises to Try
- Exercise: How to Get Started
- Exercise: How to Stay Active

Where to Find Information on Talking with Your Doctor:
- Home Page/Healthy Aging

Where to Find Exercise Prescription:
- Lots of articles most are general information regarding talking to the doctor regarding illnesses and disease.

Exercise Videos:
- Lots – excellent information

Exercise Instructions:
- Lots – excellent descriptions

General Information:
- Easy to navigate.
- Have exercise stories from Older Adults - good info.
- Key audience is older adults.

<table>
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<tr>
<th>NIH: National Institute on Aging</th>
<th><a href="https://www.nia.nih.gov/">https://www.nia.nih.gov/</a></th>
<th>Yes</th>
<th>Yes</th>
<th>No</th>
<th>Some</th>
<th>Some</th>
<th>Endurance Strength Balance Flexibility</th>
</tr>
</thead>
</table>

Where to Find Exercise Information:
- Second Navigation Tab: Health and Aging

Where to Find Information on Talking with Your Doctor:
- Various links about how to find a doctor, talking to your doctor regarding surgery.

Where to Find Exercise Prescription:

Exercise Videos:
- Videos on Disease, Illness.
- Had to search too much and click several times to get to videos

Exercise Instructions:
- Had to search too much and click several times to find instructions. When found, the instructions were excellent.

General Information:
- General public.
- Too many clicks to find information

<table>
<thead>
<tr>
<th>United States National Library of Medicine</th>
<th><a href="https://www.nlm.nih.gov/">https://www.nlm.nih.gov/</a></th>
<th>Some what</th>
<th>Yes</th>
<th>No</th>
<th>Few</th>
<th>Few</th>
<th>Many Terms including Endurance Strength Balance Flexibility</th>
</tr>
</thead>
</table>

Where to Find Exercise Information:
- Search for Exercise. 18,666 results for Exercise.
- These are not written for the consumer, rather academics and doctors

Where to Find Information on Talking with Your Doctor:
- Search for Talk to Doctor.
- 7,115 Search results for “Talk to your Doctor.”
- Academic articles – not consumer articles
- Illness and Disease specific

Where to Find Exercise Prescription:
- Search for Exercise Prescription
- 4,437 search results for Exercise Prescription
- Academic articles – not consumer articles

Exercise Videos:
- Searched for videos
- 17,115 for results for videos
- Illness and Disease specific
- Mostly Fact Sheets

Exercise Instructions:
- Searched for exercise instructions
- 5,631 search results
- Mostly scholarly articles.
- Face Sheets
General Information:
- This is a library website with all academic and medical articles that have federal funding. Medline, PubMed.
- Links to http://nihseniorhealth.gov/

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<tr>
<th>Mayo Clinic</th>
<th><a href="http://www.mayoclinic.org/">http://www.mayoclinic.org/</a></th>
<th>Yes</th>
<th>Some</th>
<th>No</th>
<th>Yes</th>
<th>Yes</th>
<th>Aerobic Stretching Flexibility Strength</th>
</tr>
</thead>
</table>

Where to Find Exercise Information:
- First Tab Patient Care and Information. Pull down menu Healthy Living. Scroll down to Healthy Aging

Where to Find Information on Talking with Your Doctor:
- First Navigation Tab: Patient Care and Health Information/Healthy Lifestyle/Healthy Aging/ In Depth/Exercise: Check with your Doctor
  http://www.mayoclinic.org/healthy-lifestyle/fitness/in-depth/exercise/art-20047414
- Six Clicks.
- Basic information. Information for all adults 21 to 100 plus.

Where to Find Exercise Prescription:
- Search Results: 819 articles when searched for Exercise prescription.
- Most information is “Talk to Your Doctor”.

Exercise Videos:
- Difficult to find. Easier to Google: Exercise Video Mayo Clinic.
- Excellent videos

Exercise Instructions:
- Difficult to find. Easier to Google: Exercise instructions Mayo Clinic

General Information:
- Easy to use website. Good Navigation.
- Easy to understand information on Patient Care and Health Information. Written for lay people.
- Good Exercise videos.
- Full service website for appointments. Secured part of site for personnel medical information.
- Other information includes Jobs and Research. Often attempt to sell their products (Books)

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<tr>
<th>Cleveland Clinic</th>
<th><a href="http://my.clevelandclinic.org/">http://my.clevelandclinic.org/</a></th>
<th>Yes</th>
<th>Yes</th>
<th>No</th>
<th>No</th>
<th>No</th>
<th>Aerobic Stretching Weight Training</th>
</tr>
</thead>
</table>

Where to Find Exercise Information:
- Second Navigation Tab: Health Information/Healthy Living/Challenges and Choices of Aging/Staying Healthy in Your Golden Years: Nutrition Exercise & Safety

Where to Find Information on Talking with Your Doctor:
- Searched: 495 Results for Talk to your Doctor.
- Little specifics except, “Ask your doctor before you begin to exercise.”

Where to Find Exercise Prescription:
- Searched: 419 results returned for Exercise Prescription.
- Little on actual exercise
  - Articles say “talk to your doctor if you plan on exercising.”

Exercise Videos:
Exercise Instructions:
General Information:
- Not an easy website to navigate.
- Lots of articles, few photos or graphics.
- Found little to nothing on exercise or PA.

| Massan zero General Hospital | http://www.massgeneral.org/ | No | No | No | Few | None | None |

Where to Find Exercise Information:
Where to Find Information on Talking with Your Doctor:
Where to Find Exercise Prescription:
- Searched: 142 Results ranging from Rotator Cuff to Erectile Dysfunction.
- No specific info on older adults

Exercise Videos:
- Found One – Had to search for a long time
Exercise Instructions:
- Difficult to find exercise material.
- Because it was difficult to find Exercise information, no terms

General Information:
- Hospital website. More about "conditions and treatments", "Centers and Services" "Research" and "Clinical Trials".
- Not an easy website to navigate.

| New York Presbyterian Hospital | http://www.nyukhospit al.com/ | No | No | No | No | None | No |

Where to Find Exercise Information:
Where to Find Information on Talking with Your Doctor:
Where to Find Exercise Prescription:
- Nothing for older adults

Exercise Videos:
Exercise Instructions:
General Information:
- This was a very difficult website to maneuver. Type font is very small.
- Has a large Medical Library - a Navigation Tab with many articles.
- Found one Exercise and the Aging Person. Very basic. Tells reader to talk to doctor before exercising.

<p>| UCSF | <a href="http://www.ucsfhealth">http://www.ucsfhealth</a> | No | No | Fe | No | No | No |</p>
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<tr>
<th>Medical Center, San Francisco</th>
<th>th.org/</th>
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<tbody>
<tr>
<td><strong>Where to Find Exercise Information:</strong></td>
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<td><strong>Where to Find Information on Talking with Your Doctor:</strong></td>
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<td><strong>Where to Find Exercise Prescription:</strong></td>
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<td>• Searched: 99 Results. None for older adults</td>
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<td><strong>Exercise Videos:</strong></td>
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<td><strong>Exercise Instructions:</strong></td>
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<tr>
<td><strong>General Information:</strong></td>
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<td>• On Home Page, above the fold, large photo of older man exercising.</td>
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<td>• Lots of specialized articles, example - Exercising with Cancer.</td>
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<td>• Most of the articles are press releases.</td>
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<td><strong>University of Pennsylvania Health System</strong></td>
<td><strong><a href="http://www.pennmedicine.org/">http://www.pennmedicine.org/</a></strong></td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
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<td><strong>Where to Find Exercise Information:</strong></td>
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<tr>
<td><strong>Second Navigation Tab: Patient Information/Patient Resources/Care Guide/Exercises/Exercise Guide/Individual Articles</strong></td>
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<tr>
<td>• Six Clicks</td>
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<td><strong>Where to Find Information on Talking with Your Doctor:</strong></td>
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<tr>
<td>• Focuses on illness and disease rather than well care and exercise</td>
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<td><strong>Where to Find Exercise Prescription:</strong></td>
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<td><strong>Exercise Videos:</strong></td>
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<td><strong>Exercise Instructions:</strong></td>
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<tr>
<td><strong>General Information:</strong></td>
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<tr>
<td>• Has good articles on specific illnesses and exercise, such as Parkinson's Disease, Joint Pain</td>
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<tr>
<td>• Lots of information written for consumer.</td>
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<td><strong>University of California, San Francisco Medical Center</strong></td>
<td><strong><a href="http://www.ucsfhealth.org/">http://www.ucsfhealth.org/</a></strong></td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>Where to Find Exercise Information:</strong></td>
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<tr>
<td>• Had to do a search. 796 Results. Most were illness specific.</td>
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<tr>
<td><strong>Where to Find Information on Talking with Your Doctor:</strong></td>
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<tr>
<td><strong>Where to Find Exercise Prescription:</strong></td>
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<tr>
<td>• Had to do a search. Used U.S. Department of Health and Human Services guidelines for exercise.</td>
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</tbody>
</table>
- Did not have specifics for older adults

**Exercise Videos:**
- Had 133 videos – illness specific. Not general exercise.

**Exercise Instructions:**
- None

**General Information:**
- Navigation is not easy.
- Used Search box to find information.
- Information is illness specific.
- Discussion of concept of aging.

<table>
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<tr>
<th>Ronald Reagan UCLA Medical Center</th>
<th><a href="https://www.uclahealth.org/reagan/Pages/default.aspx">https://www.uclahealth.org/reagan/Pages/default.aspx</a></th>
<th>No</th>
<th>No</th>
<th>Found 6 Articles</th>
<th>No</th>
<th>No</th>
<th>No</th>
</tr>
</thead>
</table>

**Where to Find Exercise Information:**
- Fifth Tab. Health Resources. Select E. Scroll to Exercise. Six Articles.

**Where to Find Information on Talking with Your Doctor:**

**Where to Find Exercise Prescription:** None

**Exercise Videos:** None

**Exercise Instructions:** None

**General Information:**
- A very hospital centric website
- Fifth Tab: Health Resources. Selected Exercise. Six articles. One on exercise and the aging person. Article said to talk to your doctor before beginning an exercise regimen.
- Difficult site to navigate.
- Site is translated in 91 languages.

<table>
<thead>
<tr>
<th>Brigham and Women's Hospital, Boston</th>
<th><a href="http://www.brighamandwomens.org/">http://www.brighamandwomens.org/</a></th>
<th>Yes</th>
<th>Two</th>
<th>No</th>
<th>No</th>
<th>No</th>
<th>Aerobic, Balance, Strength</th>
</tr>
</thead>
</table>

**Where to Find Exercise Information:**
- Fourth Navigation Tab: Diseases and Conditions/Home Health, Hospice, and Elder Care/Adult Health Library/Elder Care

**Where to Find Information on Talking with Your Doctor:**
- Searched for Talking to Your Doctor. Found two articles on exercise. General information. No specifics other than “talk to your doctor before beginning an exercise routine.”

**Where to Find Exercise Prescription:**
- None

**Exercise Videos:**
- Last Tab: Tools and Multimedia/Video Library
- No Specific Video on Exercise
- Videos on common diseases and conditions and diagnostic tests & procedures.

Exercise Instructions:
- None

General Information:
- Good Tools.
  - Translation, Text Size
- Lots of material. Need to spend time searching.
- One of the few sites that doesn't recognize older adults as viable, rather "elder" and Medicare issues.
- Complex website

<table>
<thead>
<tr>
<th>Barnes-Jewish Hospital/Washington University St. Louis</th>
<th><a href="http://www.barnesjewish.org/">http://www.barnesjewish.org/</a></th>
<th>No</th>
<th>No</th>
<th>No</th>
<th>No</th>
<th>No</th>
<th>None</th>
</tr>
</thead>
</table>

Where to Find Exercise Information:
Where to Find Information on Talking with Your Doctor:
Where to Find Exercise Prescription:
Exercise Videos:
Exercise Instructions:

General Information:
- This is strictly a hospital website, along with long-term elder care and hospice.
- They have a Fitness Center. Information available on how to join.
- There are Community Programs and they provide trained exercise specialists who teach these programs.

<table>
<thead>
<tr>
<th>Texas Medical Center</th>
<th><a href="http://www.texasmedicalcenter.org/">http://www.texasmedicalcenter.org/</a></th>
<th>No</th>
<th>No</th>
<th>No</th>
<th>No</th>
<th>No</th>
<th>None</th>
</tr>
</thead>
</table>

Where to Find Exercise Information:
Where to Find Information on Talking with Your Doctor:
Where to Find Exercise Prescription:
Exercise Videos:
Exercise Instructions:

General Information:
- The website is an umbrella website for 21 hospitals, 14 support organizations, 10 academic institutions, eight academic and research institutions, seven nursing programs, three public health organizations, three medical schools, two pharmacy schools, and a dental school.
- Using the Search tool for Exercise, Talk to Doctor, and Exercise Prescription, there were zero results.

| Duke | https://www.dukem | Little | Yes | No | No | No | Aerobic |
Where to Find Exercise Information:

Where to Find Information on Talking with Your Doctor:
- Had to search. Search results had over 250 articles, all were specific about a disease and article said “talk to your doctor.”

Where to Find Exercise Prescription:
- Searched – Five Articles
  - Cancer Rehabilitation, Membership Option, Internship Programs, Weigh Loss, Membership Rates.

Exercise Videos:
Exercise Instructions:
General Information:
- Website difficult to find information.
- Was surprised at how little information there was and the difficulty of finding that information.
- They have a “gait analysis” program, but this was found by accident. Not easy to find.

Johns Hopkins http://www.hopkinsmedicine.org/
Yes Yes Yes Yes Yes Yes
Aerobic Resistance Strength Stretch Flexibility Balance

Where to Find Exercise Information:
- Second Tab: Health/Healthy Aging
  - Many articles and features
- Second Tab: Health/Health Library/Exercise
  - Many articles and features

Where to Find Information on Talking with Your Doctor:
- Searched Talk to Doctor
  - Approximately 1600 articles about specific illnesses

Where to Find Exercise Prescription:
- Searched Exercise Prescription
- 591 articles
- Most were general information regarding a specific illness and exercise.
- Well written and easy to understand

Exercise Videos:
- Many – easy to understand

Exercise Instructions:
- Many – easy to understand

General Information:
- Easy to navigate website
- Consumer friendly
- Wealth of articles and information about exercise and physical activity

<table>
<thead>
<tr>
<th>University of Pittsburgh Medical Center</th>
<th><a href="http://www.upmc.com">http://www.upmc.com</a></th>
<th>Yes</th>
<th>Yes</th>
<th>Yes</th>
<th>Yes</th>
<th>No</th>
<th>Aerobic Strength Balance Muscle Fitness Flexibility</th>
</tr>
</thead>
</table>

Where to Find Exercise Information:
- First Tab: For Patients, Family, Visitors/Seniors/
- Many hundreds of articles

Where to Find Information on Talking with Your Doctor:
- Searched “Talk to Doctor. Returned 3,718 results.
- Some articles specifically about exercise

Where to Find Exercise Prescription:
- Searched “Exercise Prescription”. 625 articles. Most illness specific

Exercise Videos:
- Many videos. Need to carefully search to find specific type of exercise.

Exercise Instructions:

General Information:
- Excellent Health Library. Easy to navigate. Categories include Men, Women, Seniors, Kids

<table>
<thead>
<tr>
<th>Kaiser Permanente</th>
<th><a href="https://healthy.kaiserpermanente.org/html/kaiser/index.shtml">https://healthy.kaiserpermanente.org/html/kaiser/index.shtml</a></th>
<th>Yes</th>
<th>Yes</th>
<th>Yes</th>
<th>Yes</th>
<th>Yes</th>
<th>Aerobics</th>
</tr>
</thead>
</table>

Where to Find Exercise Information:
- Second Tab: Health and Wellness/Senior Health

Where to Find Information on Talking with Your Doctor:
- Searched “Talk to Doctor”. 4267 search results. Most were on specific illnesses and diseases and not exercise.

Where to Find Exercise Prescription:
- Searched “Exercise Prescription.” 649 Results. All with illness specific.

Exercise Videos:
- 110 Exercise Videos.

Exercise Instructions:
- Searched Exercise Instructions. 1346 Results. Majority were illness specific.

General Information:
- A feature that no other website had. Each page for seniors, it was available via audio.
- Excellent articles.
- Lots of searching
- Ability to schedule appointments online
- Ability to review test results online
- Ability to email doctor on a secured private server
- Ability to increase font size
- User centric website.

<table>
<thead>
<tr>
<th>Group Health Cooperative</th>
<th><a href="https://www.ghc.org/">https://www.ghc.org/</a></th>
<th>Yes</th>
<th>Yes</th>
<th>Yes</th>
<th>No</th>
<th>No</th>
<th>None</th>
</tr>
</thead>
</table>

Where to Find Exercise Information:
- Searched “Exercise.” 669 Search Results. Found nothing regarding exercise and older adults. Most exercise information was illness specific.

Where to Find Information on Talking with Your Doctor:
- Searched “Talk to Doctor.” Eight Search Results. None were about older adults.

Where to Find Exercise Prescription:
- Searched “Exercise Prescription.” 66 Search Results. None were for older adults. All were illness or condition (pregnancy) specific.

Exercise Videos:
Exercise Instructions:
General Information:
- Were part of the Silver Sneakers program, however information limited.
- Hard website to navigate. Had to search for everything.

<table>
<thead>
<tr>
<th>Veterans Affairs Healthcare System</th>
<th><a href="http://www.va.gov/health">http://www.va.gov/health</a></th>
<th>Yes</th>
<th>Yes</th>
<th>Yes</th>
<th>No</th>
<th>No</th>
<th>No Specific terms</th>
</tr>
</thead>
</table>

Where to Find Exercise Information:
- Health Topics A-Z did not list Exercise.
- Searched for “Exercise”. Many articles. Not easy to find specifics

Where to Find Information on Talking with Your Doctor:
- Searched for “Talk to Doctor.” Many articles but little specifics

Where to Find Exercise Prescription:
- Searched for “Exercise Prescription.” Many articles but majority were academic research articles and not consumer articles.

Exercise Videos:
Exercise Instructions:
General Information:
- Extremely hard website to find consumer information.
- Website has a “Wellness Program” area but nothing about exercise.

Where to Find Exercise Information:
- First Tab: For Patients, Family, Visitors/Seniors/
- Many hundreds of articles

Where to Find Information on Talking with Your Doctor:
- Searched “Talk to Doctor. Returned 3,718 results.
- Some articles specifically about exercise

Where to Find Exercise Prescription:
- Searched “Exercise Prescription”. 625 articles. Most illness specific
  Exercise Videos:
  - Many videos. Need to carefully search to find specific type of exercise.
Exercise Instructions:
General Information:
  - Excellent Health Library. Easy to navigate. Categories include Men, Women, Seniors, Kids

<table>
<thead>
<tr>
<th>Anytime Fitness</th>
<th><a href="https://www.anytimefitness.com/">https://www.anytimefitness.com/</a></th>
<th>No</th>
<th>No</th>
<th>No</th>
<th>No</th>
<th>No</th>
<th>No absolute terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifetime Fitness</td>
<td><a href="https://www.lifetimefitness.com/en.htm">https://www.lifetimefitness.com/en.htm</a></td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Cardio Strength</td>
</tr>
<tr>
<td>LA Fitness</td>
<td><a href="https://www.lafitness.com/Pages/Default.aspx">https://www.lafitness.com/Pages/Default.aspx</a></td>
<td>Some</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Where to Find Exercise Information:
Where to Find Information on Talking with Your Doctor:
Where to Find Exercise Prescription:
Exercise Videos:
Exercise Instructions:
General Information:
  - Many Family Activities
  - Many “Kids” Activities
  - Uses the terms Family, Kids, Youth, Group.
  - Does not appear to have older adult material.
  - Has a membership log-in and apparently can receive more information about exercise through the login including a Virtual Trainer.
Equipment/Exercise 101.

General Information:
- Has a membership log-in and apparently can receive more information once a member.
- Had an interesting section titled “Ask our Dietician.”
- Could sign-up for newsletter without becoming a member.
- Has a blog that is well written for the consumer with timely information.
- Could not find anything specifically for older adults.

<table>
<thead>
<tr>
<th>YMCA</th>
<th><a href="http://www.ymca.net/">http://www.ymca.net/</a></th>
<th>Yes</th>
<th>No</th>
<th>No</th>
<th>No</th>
<th>No</th>
<th>Cardio, Dance Group Power Strength, Indoor Cycling, Martial Arts, Pilates, Strength and Sculpt, Yoga, Zumba</th>
</tr>
</thead>
</table>

Where to Find Exercise Information:
- Second Navigation Tab: Healthy Living/Health Well-Being and Wellness Fitness

Where to Find Information on Talking with Your Doctor:
Where to Find Exercise Prescription:
Exercise Videos:
Exercise Instructions:
General Information:
- This is the national website.
- Checked the local YMCA – West Valley YMCA. Similar website.
- Searched for Silver Sneakers – no results.

<table>
<thead>
<tr>
<th>AARP</th>
<th><a href="http://www.aarp.org">http://www.aarp.org</a> /</th>
<th>Yes</th>
<th>No</th>
<th>No</th>
<th>Yes</th>
<th>Yes</th>
<th>Everything</th>
</tr>
</thead>
</table>

Where to Find Exercise Information:
- Needed to create Searches and read extensively

Where to Find Information on Talking with Your Doctor:

Where to Find Exercise Prescription:

Exercise Videos:
- Had to search.
- Found several. Needed to read a lot.
Exercise Instructions:
- Found several. Needed to read a lot.

General Information:
- Navigation Tabs under Health
  - Medicare & Medicaid
  - Health Insurance
  - Conditions & treatment
  - Healthy Living
  - Drugs & Supplements
  - Brain Health
  - Caregiving
- Website covers many issues for older adults. Finding information on exercise requires time and patience.

<table>
<thead>
<tr>
<th>Exercise is Medicine</th>
<th><a href="http://www.exerciseismedicine.org/">http://www.exerciseismedicine.org/</a></th>
<th>Yes</th>
<th>Yes</th>
<th>Yes</th>
<th>No</th>
<th>No</th>
<th>Aerobic Strength</th>
</tr>
</thead>
</table>

Where to Find Exercise Information:
- Substantial information for medical professionals on why physical activity is beneficial.

Where to Find Information on Talking with Your Doctor:
- This site is for doctors, health care providers and exercise professionals

Where to Find Exercise Prescription:
- The site has an exercise prescription pad, that doctors can use to discuss exercise with their patients.

Exercise Videos:
Exercise Instructions:
General Information:
- This is a website for the medical community.
APPENDIX B

EXERCISE PRESCRIPTION

This Appendix presents the exercise prescriptions that were developed as part of this project. They are presented here in an uninterrupted flow of pages. In actual use they will each be created as a standalone document for distribution. The exercise prescriptions presented below include:

- Endurance
- Resistance
- Flexibility
- Balance
- Type 2 Diabetes Mellitus and Pre-Diabetic Conditions
- Restless Leg Syndrome
- Night Leg Cramps
- Sarcopenia
Endurance Exercise
First Discussion with your Doctor

- If you haven’t exercised nor done very much endurance exercise, start simple.
- Discuss with your doctor your duration in the beginning and how many minutes you should add weekly.
- For some older adults, a moderate-intensity walk may be a slow walk and for other older adults it may be a brisk walk.

**Guidelines**

<table>
<thead>
<tr>
<th>Guideline Component</th>
<th>Guideline Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercises</td>
<td>Endurance/Aerobic</td>
</tr>
<tr>
<td>Type</td>
<td>Walking, Running, Water, Aerobics, Swimming, Bicycling, Stationary Cycle Bike</td>
</tr>
<tr>
<td>Frequency</td>
<td>Moderate Intensity</td>
</tr>
<tr>
<td></td>
<td>- 30 minutes a day</td>
</tr>
<tr>
<td></td>
<td>- Five days a week</td>
</tr>
<tr>
<td></td>
<td>- 150 Minutes a week</td>
</tr>
<tr>
<td>Vigorous intensity</td>
<td>- 20 minutes a day</td>
</tr>
<tr>
<td></td>
<td>- Three days a week minimum</td>
</tr>
<tr>
<td></td>
<td>- 70 minutes a week</td>
</tr>
<tr>
<td>Intensity</td>
<td>- Use a scale of 0 – 10 for level of physical exertion.</td>
</tr>
<tr>
<td></td>
<td>- 0 is the level of effort when you sit on a chair.</td>
</tr>
<tr>
<td></td>
<td>- 5-6 is Moderate Intensity</td>
</tr>
<tr>
<td></td>
<td>- A 5 or 6 produce noticeable increases in breathing and heart rate.</td>
</tr>
<tr>
<td></td>
<td>- A person doing moderate-intensity activity can talk but not sing while exercising.</td>
</tr>
<tr>
<td></td>
<td>- 7 or 8 is Vigorous Intensity:</td>
</tr>
<tr>
<td></td>
<td>- A person doing vigorous-intensity activity can't say more than a few words without stopping for a breath.</td>
</tr>
</tbody>
</table>
Questions to Ask Your Doctor

1. Which of these activities would you recommend for me?
   - Walking
   - Running
   - Swimming
   - Water Aerobics
   - Treadmill
   - Other:_____________________

2. Which of these activities shouldn’t I do?
   - Walking
   - Running
   - Swimming
   - Water Aerobics
   - Treadmill
   - Other:_____________________

3. Do any of the prescriptions I take interfere with my endurance exercise?
   - If yes, what should I do?_________________________________________________________
     __________________________________________________
     __________________________________________________

4. If you have any of the following illnesses, discuss specific endurance exercises, limitations and what to watch for.
   - Diabetes
   - Hypertension,
   - Heart disease
   - Arthritis
   - Pulmonary conditions
   - Other health conditions may need additional safety guidelines for exercise.

5. Once you start exercising, discuss what you did during your next doctor’s visit. Keeping an exercise log helps. Bring it with you to your next appointment.

6. If you have any of these issues while exercising, talk to your doctor
   - unusual shortness of breath
   - tightness in the chest; chest, shoulder, or jaw pain
   - lightheadedness
   - dizziness
   - confusion
   - joint pain
NOTES:

- If you live in a cold climate, or don’t like walking outside, many community centers and schools in have opened their buildings for indoor walking. They are safe environments.

Citations


Strength training becomes more important as you grow older. Make sure you do both upper body and lower body exercises.

Discuss with your doctor how long (duration) you should do exercises in the beginning and how many minutes to add weekly.

If you haven’t exercised before or have done very little strength training, start simple.

Strength exercises can be done with no special equipment. If you want to buy equipment, Resistance Bands are excellent and can be found in most sports stores and on the Internet.

If you have a gym membership, there are many machines that you can use. Ask a gym employee how to use them. If you are using weightlifting machines, make sure you receive training. Ask for someone who has training or is sensitive to the needs of an older adult to monitor and supervise your initial sessions.

**Guidelines**

<table>
<thead>
<tr>
<th>Guideline Component</th>
<th>Guideline Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Strength/Endurance</td>
</tr>
</tbody>
</table>
| Exercises           | Upper and Lower Body Exercises, Resistance Bands, Weight lifting (start with one pound weights), Pilates. Do exercises for both upper body and lower body.  
- Upper Body: Wrist Curls, Overhead Arm Raises, Front Arm Raises, Side Arm Raises, Arm Curl, Wall Push-up, Chair Dip  
- Lower Body: Back leg raise, Side Leg Raise, Plank, Straight leg raises, Heel step downs, Knee Curl, Chair Stand, Toe Stand |
| Frequency           |  
- Performed on two or more nonconsecutive days per week  
- If you do muscle strengthening exercise two days in a row, one day should be upper body and the next day should be lower body. |
<table>
<thead>
<tr>
<th>Sets</th>
<th>• Complete eight to ten exercises involving the major muscle groups.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repetition</td>
<td>• Each exercise should be repeated ten to 15 times.</td>
</tr>
<tr>
<td></td>
<td>• It is recommended that older adults should exceed the minimum recommended amount if you have no medical conditions that would preclude you doing so.</td>
</tr>
<tr>
<td>Intensity</td>
<td>• Use a scale of 0 – 10 for level of physical exertion/intensity.</td>
</tr>
<tr>
<td></td>
<td>• 0 is the level of effort when you sit on a chair.</td>
</tr>
<tr>
<td></td>
<td>• 5-6 is Moderate Intensity</td>
</tr>
<tr>
<td></td>
<td>• A 5 or 6 produce noticeable increases in breathing and heart rate.</td>
</tr>
<tr>
<td></td>
<td>• 7 or 8 is Vigorous Intensity:</td>
</tr>
<tr>
<td></td>
<td>• A person doing vigorous-intensity activity can't say more than a few words without stopping for a breath.</td>
</tr>
<tr>
<td>Rest and Breathing</td>
<td>• Rest between each repetition.</td>
</tr>
<tr>
<td></td>
<td>• Moderate Intensity:</td>
</tr>
<tr>
<td></td>
<td>• 1-2 minutes between each repetition for light weight bearing exercise.</td>
</tr>
<tr>
<td></td>
<td>• Vigorous Intensity:</td>
</tr>
<tr>
<td></td>
<td>• 2-3 min for higher intense exercises that use heavier loads.</td>
</tr>
<tr>
<td></td>
<td>Normal breathing on each repetition. Do not hold your breath.</td>
</tr>
<tr>
<td>Duration</td>
<td>Approximately 30 minutes.</td>
</tr>
</tbody>
</table>

**Questions to Ask Your Doctor**

1. Which of these strength activities would you recommend for me?
   - [ ] Upper body
   - [ ] Lower body
   - [ ] Both
2. If you are planning on using resistance bands, ask your doctor what color you should begin with. Resistance bands are excellent products and everyone, no matter what age, can use them (color corresponds to the amount of resistance).

- Tan
- Yellow
- Red
- Green
- Blue
- Black
- Silver
- Gold

3. If you are using weights, ask your doctor what weight you should begin with.
   a. How many pounds should I begin to lift for upper body exercises?
   b. How many pounds should I begin to lift for lower body exercises?

4. If you are lifting any type of weights, ask your doctor what is the minimum weight you can do and what is the maximum weight.
   - Minimum Weight: ____________________________
   - Maximum Weight: ____________________________

5. If you have any of the following illnesses, discuss specific strength training exercises, limitations and what to watch for.
   - Type 2 Diabetes

   - Osteoarthritis. Strength training improves joint function and reduces pain. However, if this is the first time you are doing strength training, ask your doctor if there is anything specific you should or should not do.

   - Other health conditions may need additional safety guidelines for exercise.

6. Once you start exercising, discuss what you did during your next doctor’s visit. Keeping an exercise log helps. Bring it with you to your next appointment.

7. If you have any of these issues while exercising, talk to your doctor
   - unusual shortness of breath
   - tightness in the chest; chest, shoulder, or jaw pain
   - lightheadedness
   - dizziness
NOTES:

- Resistance bands, also known as TheraBand™ bands are an excellent way for older adults to begin resistance training. You can buy them at most sporting goods stores and online. They are color coded and you should use the lighter ones to begin with and move to the next level when you feel that the light one is no longer as effective as it once had been. The lighter resistance levels are tan and yellow. The medium levels are red and green. The higher levels ones are blue, black, silver and gold.

- Before you begin your weight lifting exercises, spend five to ten minutes warming up. Two good warm-up exercises are a treadmill or a stationary cycle. This helps warm up the muscles to be targeted in your strength session.

- If you lift weights, check your breathing. Inhale just before and during the lowering phase of the repetition and exhale during the lifting phase.

- Muscle strength declines approximately 15 percent each decade after the age of 50. After the age of 70, the muscle strength decline increases dramatically to 30 percent each year.

- Strength training may reduce pain and disability in individuals with osteoarthrosis.

Citations:


Flexibility Exercises: First Discussion with your Doctor

- Flexibility is the ability to move a joint through its complete Range of Motion.
- Flexibility exercises may be a key element for successfully performing daily activities, such as dressing, walking, and preparing meals.

### Guidelines

<table>
<thead>
<tr>
<th>Guideline Component</th>
<th>Guideline Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Flexibility Exercises</td>
</tr>
<tr>
<td>Exercises</td>
<td>Shoulder and Upper Arm Stretches, Upper Body Stretches, Chest Stretches, Upper Back Stretches, Ankle Stretches, Leg stretches, Thigh Stretches, Calf Stretches, Hip Stretches, Lower Back Stretches</td>
</tr>
<tr>
<td>Frequency</td>
<td>• A minimum of twice a week.</td>
</tr>
<tr>
<td>Repetition</td>
<td>• Repeat each stretch 2 to 4 times.</td>
</tr>
<tr>
<td>Intensity</td>
<td>• Stretch to where there is a feeling of tightness or slight discomfort.</td>
</tr>
<tr>
<td>Time</td>
<td>• Hold each stretch for 30 – 60 seconds.</td>
</tr>
<tr>
<td>Rest and Breathing</td>
<td>• Rest briefly between each repetition.</td>
</tr>
<tr>
<td></td>
<td>• Normal breathing on each repetition. Do not hold your breath.</td>
</tr>
<tr>
<td>Duration</td>
<td>Approximately 10 - 15 minutes.</td>
</tr>
</tbody>
</table>
Questions to Ask Your Doctor

1. Which of these stretching exercises would you recommend for me?
   - Shoulder and Upper Arm Stretches
   - Upper Body Stretches
   - Chest Stretches
   - Upper Back Stretches
   - Ankle Stretches
   - Leg Stretches
   - Thigh Stretches
   - Calf Stretches
   - Hip Stretches
   - Lower Back Stretches

2. Which of these stretches exercises should I not do?
   - Shoulder and Upper Arm Stretches
   - Upper Body Stretches
   - Chest Stretches
   - Upper Back Stretches
   - Ankle Stretches
   - Leg Stretches
   - Thigh Stretches
   - Calf Stretches
   - Hip Stretches
   - Lower Back Stretches

3. If you have an issue or pain with any of the following joints, discuss it with your doctor. These are your primary joints.
   - Shoulder ________________________________
   - Elbow ________________________________
   - Forearm _________________________________
   - Wrist _________________________________
   - Hip _________________________________
   - Knee _________________________________
   - Ankle _________________________________
   - Foot _________________________________

4. If you have arthritis, stretching may be helpful. Discuss your arthritic condition and stretching issues with your doctor.

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
5. If you have been injured, discussed your injury and what your stretching routine should be with your doctor. You may need to modify your stretching routine if you have a strained muscle.

NOTES:

- Do your flexibility exercises after you have completed your strength and/or endurance exercises. Flexibility exercises are excellent for the “cool-down” stage of exercising.
- Sometimes, you may need to approach stretching with caution. If you have a chronic condition or an injury, you may need to adjust your stretching techniques. For example, if you already have a strained muscle, stretching it may cause further harm.
- Don't consider stretching a warm-up. You may hurt yourself if you stretch cold muscles. Before stretching, warm up with light walk or jog at low intensity for five to ten minutes. Yoga is excellent for flexibility exercises. Many senior citizen centers and libraries offer yoga classes.

Citations


Balance Exercise: First Discussion with your Doctor

- Balance exercise improves coordination and muscle strength.
- Balance and strength training is known to help reduce falls in older adults.
- If you have never exercised or done very little, then start simple. Do not attempt to do all of these exercises immediately. Do the simple ones until you feel confident. Once you have mastered a balance exercise in a stable fashion, without the need for support (chair, another person), add another exercise that will be more challenging. Always be careful.
- Have a sturdy chair or a person nearby to hold onto if you feel unsteady.
- You can also incorporate balance exercise in your daily activity. As an example, when you are doing dishes, move your feet closer together, or stand on one leg if possible while you are washing the dishes. Alternate legs every 15 to 30 seconds.
- Many Senior Citizen Centers, City Parks, and Community Centers offer Tai Chi classes. They are excellent, not only for balance exercises, but you will be able to do this with other people.
- These same facilities may offer balance sessions. If they do, this is an excellent place to exercise. There is a class titled BodyBalance that is used in 14,000 facilities in the United States. If your local center offers this, check it out. It has been studied extensively and has shown positive results.

Guidelines

<table>
<thead>
<tr>
<th>Guideline Component</th>
<th>Guideline Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercises</td>
<td>Balance Exercises (see Type below), Yoga, Tai Chi</td>
</tr>
</tbody>
</table>
| Type                | Progressively difficult postures that gradually reduce the base of support.  
|                     | - **Back leg raise**, One-legged stand, Side leg raise  
|                     | Dynamic movements that perturb the center of gravity. These include  
|                     | - Circle turns, Heel to toe walk, Balance walk  
|                     | Stressing Postural Muscles groups  
|                     | - Heel Stands, **Toe stands**  
|                     | Reducing sensory input  
|                     | - Standing with Eyes close  
|                     | Tai Chi |
| Frequency           | Minimum twice a week. You can do these daily if you want. |
| Repetitions         | The optimal number of repetition of each exercise is still being |
studied. It is important that individuals complete the recommended duration each week (see below).

<table>
<thead>
<tr>
<th>Duration</th>
<th>20-30 minutes per session per day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>60 minutes a week minimum</td>
</tr>
</tbody>
</table>

Intensity

Hold the exercise until you are no longer comfortable. Don’t overdo it. Each time you perform the exercise, attempt to hold it one or two seconds longer.

Questions to Ask Your Doctor

1. Are there any balance exercises that you recommend that I should NOT do?
   - Back Leg raise
   - One-legged stand
   - Side leg raise
   - Circle turns
   - Heel to toe walk
   - Balance Walk
   - Heel Stands
   - Toe Stands
   - Standing with Eyes close
   - Tai Chi
   - Other: ______________________

2. If you have had a fall, discuss balance exercises with your doctor.
   a. Specifically which balance exercises should I do?
      - Back Leg raise
      - One-legged stand
      - Side leg raise
      - Circle turns
      - Heel to toe walk
      - Balance Walk
      - Heel Stands
      - Toe Stands
      - Standing with Eyes close
      - Tai Chi
      - Other: ______________________

   b. Specifically which exercises should I NOT do?
      - Back Leg raise
3. If you have neuropathy, discuss balance exercises with your doctor.
   - Specifically which exercises **should I do?**
     - One-legged stand
     - Side leg raise
     - Circle turns
     - Heel to toe walk
     - Balance Walk
     - Heel Stands
     - Toe Stands
     - Standing with Eyes close
     - Tai Chi
     - Other:_____________________
   - Specifically which exercises **should I NOT do?**
     - Back Leg raise
     - One-legged stand
     - Side leg raise
     - Circle turns
     - Heel to toe walk
     - Balance Walk
     - Heel Stands
     - Toe Stands
     - Standing with Eyes close
     - Tai Chi
     - Other:_____________________

4. If you have Parkinson’s disease, discuss balance exercise with your doctor.
   Balance exercise is crucial for individuals with Parkinson’s disease, but each individual has special needs. It is recommended that you have a chair for stability.
or nearly rails or parallel bars for support. There are many specific balance exercises recommended for individuals with Parkinson’s disease including, stepping in all directions, step up and down, reaching forward and sideways, standing up and sitting down. Others include Tai Chi and dancing, especially dances that involve holding a partner such as the waltz and the tango. Which exercises should I consider?

- Stepping in all directions
- Stepping up and down
- Reaching forward and sideways
- Standing up and sitting down
- Other: ______________

5. Once you start exercising, discuss what you did on your next doctor’s visit. Keeping an exercise log helps. Bring it with you to your next appointment.

6. If you have any of these issues while exercising, talk to your doctor

- lightheadedness
- dizziness
- confusion
- Other: ______________________

7. Your doctor may want to perform some simple tests on you. One is the Iconographical Falls Efficacy Scale. It is a paper test and extremely easy to take.

**Citations**


Type 2 Diabetes Mellitus & Pre-Diabetic Conditions: First Discussion with your Doctor

- If you have Type 2 Diabetes or have Pre-Diabetic Conditions, you need to speak with your doctor before beginning physical activity.

- While exercise is known as a strategy for many individuals in controlling Type 2 Diabetes, it is not often prescribed.

- Exercise has been proven to be helpful in decreasing body fat in individuals with Type 2 diabetes. Current guidelines from the American Diabetes Association, the American College of Sports Medicine, and 2008 Physical Activity Guidelines for Americans all advise a combination of aerobic and resistance training for optimal health benefit.

Guidelines

<table>
<thead>
<tr>
<th>Type of Exercise</th>
<th>Intensity</th>
<th>Duration, Week</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerobic (walking,</td>
<td>Moderate</td>
<td>210 minutes per week (3 hours, 30 minutes)</td>
<td>No more than 2 consecutive days without exercising</td>
</tr>
<tr>
<td>running, biking,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>swimming)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aerobic</td>
<td>Vigorous</td>
<td>125 minutes per week (2 hours, 5 minutes)</td>
<td>No more than 2 consecutive days without exercising</td>
</tr>
<tr>
<td>Resistance</td>
<td>Moderate to Vigorous</td>
<td>60 minutes (included in totals above)</td>
<td>2 or more times per week</td>
</tr>
<tr>
<td></td>
<td>• 8-10 exercises</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 2-4 sets</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 8-10 repetitions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 1-2 minute rest</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>between</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
• Aerobic and Resistance exercises can be combined in one session.
• The information shown above are guidelines. Each individual should begin to exercise using shorter durations and build up to the recommendations over a period of time.
• Discuss with your doctor your duration in the beginning and how many minutes you should add weekly.
• Aerobic and resistance training (1) improve insulin action, (2) help control blood pressure and (3) improve fat oxidation and storage in muscles.

**Questions to Ask Your Doctor**

1) What exercises would be safe for me to do?

**Aerobic/Endurance Exercise**

☐ Walking?
☐ Stair walking?
☐ Water Aerobics?
☐ Biking?
☐ Other Recommendations?

**Resistance Exercise**

☐ Hand Held Weights?

- How much weight to begin with (two one pound cans work very well)?
☐ Resistance Bands?
☐ Wrist Curls?
☐ Arm Raises (Front Arm raises, Side Arm Raises)?
☐ Arm Curls?
☐ Leg Lifts (Back Leg Raises, Side Leg Raises)?
☐ Wall Push Ups?
☐ Other?

2) What duration (minutes per week) do you recommend that I start with? ____________
3) What exercises should I NOT do based on the fact that I have neuropathy (feet or hands)?

____________________________________________________________________________

____________________________________________________________________________

Citations


Restless Leg Syndrome

- Nocturnal leg cramps and restless legs syndrome are different.
- Nocturnal leg cramps are painful involuntary contractions of muscles, most often the calf muscles, but muscles in your feet or thighs may cramp as well and cause sleep disturbance.
- Tell your doctor about your night leg cramps, especially if you are having trouble functioning during the day because leg cramps interrupt your sleep or if you develop muscle weakness.
- Stretches of the calves and hamstrings reduces the frequency of nocturnal leg cramps. Talk to your doctor about the exercises below. Make sure you can perform all three. If you can’t perform all three, do the ones that your doctor recommends.
- These exercises should be done near bedtime. They should take approximately 10 minutes to complete each night.

Guidelines

<table>
<thead>
<tr>
<th>Stretch</th>
<th>Description</th>
</tr>
</thead>
</table>
| Calf Stretching in Standing | **Start Position:** 
Standing facing a well with the elbows extended and both palms on the wall at chest height. One leg is forward with the knee flexed (bent at the knee) and the other leg is back with the knee extended. Both feet are in full contact with the floor.

How to Apply the Stretch:
Bend the front knee so the trunk moves forward, keeping the trunk straight and the heels in contact with the floor.

Maintain Stretch for ten seconds – 30 seconds
Relax between stretches
Repeat three times with each leg. |
| Hamstring Stretch in Standing | **Starting Position:**  
Standing facing a chair that is placed against a wall. Place one heel on the chair with the knee of that leg fully extended.  

**Motion to Apply Stretch:**  
Bend at the hip so that the trunk of your body tilts forward. Keep your trunk straight. The foot on the floor should maintain full contact on the floor and the other heel remains in contact with the chair.  

Maintain Stretch for ten seconds – 30 seconds  
Relax between stretches  
Repeat three times with each leg. |
| --- | --- |
| Hamstring and calf stretch in sitting position | **Starting Position:**  
Sit on the floor or sit on a firm bed with both legs extended. Grasp your toes with both hands.  

**Motion to Apply Stretch:**  
Bend at the hips so the trunk of your body tilts forward, keeping the trunk as straight as possible. Bend your ankles upwards.  

Maintain Stretch for ten seconds – 30 seconds  
Relax between stretches  
Repeat three times. |

**Questions to Ask Your Doctor**

1. If you have cardiovascular disease, talk to your doctor about doing the above exercises.
2. If you are taking quinine, talk to your doctor about doing the above exercises.
3. Which of these three exercises do you recommend that I do?
   - [ ] Calf Stretch in Standing
   - [ ] Hamstring Stretch in Standing
   - [ ] Hamstring and calf stretch in sitting
4. Keep a log of what you do and if you have leg cramps at night. Record how many leg cramps you have. Report to your doctor on your next visit.

5. Studies indicate that if these exercises are followed nightly for a minimum of six weeks, the number of nightly cramps or the intensity of nightly cramps may diminish.

Citations


Night Leg Cramps
(Nocturnal Leg Cramps)

- Nocturnal leg cramps and restless legs syndrome are different.
- Nocturnal leg cramps cause sleep disturbance and are painful involuntary contractions of muscles, most often the calf muscles, but muscles in your feet or thighs may cramp as well.
- Tell your doctor about your night leg cramps, especially if you are having trouble functioning during the day because your sleep is interrupted or if you develop muscle weakness.
- Stretches of the calves and hamstrings reduces the frequency of nocturnal leg cramps. Talk to your doctor about the exercises below. If you can’t perform all three, do the ones that your doctor recommends.
- These exercises should be done near bedtime. They should take approximately 10 minutes to complete each night.

**Guidelines**

<table>
<thead>
<tr>
<th>Stretch</th>
<th>Description</th>
</tr>
</thead>
</table>
| Calf Stretching in Standing Position | **Start Position:** Stand facing a wall with the elbows extended and both palms on the wall at chest height. One leg should be forward with the knee flexed (bent at the knee) and the other leg is back with the knee extended (straight). Both feet are in full contact with the floor.  
**How to Apply the Stretch:** Bend the front knee so the trunk moves forward, keeping the trunk straight and the heels in contact with the floor. Maintain Stretch for ten to 30 seconds  
Relax between stretches for ten seconds  
Repeat three times with each leg as the bent forward leg. |

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# Hamstring Stretch in Standing Position

**Starting Position:**
Standing facing a chair that has its back placed against a wall. Place one heel on the chair with the knee of that leg fully extended.

**How to Apply Stretch:**
With your hands on the extended knee, bend at the hip so that the trunk of your body tilts forward. Keep your trunk straight. The foot on the floor should maintain full contact with the floor and the other heel remains in contact with the chair.

Maintain Stretch for ten to 30 seconds  
Relax between stretches for ten seconds  
Repeat three times with each leg as the one on the chair.

---

# Hamstring and calf stretch in sitting position

**Starting Position:**
Sit on the floor or sit on a firm bed with both legs extended. Grasp your toes with the fingertips of both hands.

**How to Apply Stretch:**
Bend at the hips so the trunk of your body tilts forward, keeping the trunk as straight as possible. Bend your ankles upwards.

Maintain Stretch for ten to 30 seconds  
Relax between stretches for ten seconds  
Repeat three times.

---

**Questions to Ask Your Doctor**

1. If you have cardiovascular disease, talk to your doctor about doing these exercises.
2. If you are taking quinine, talk to your doctor about doing these exercises.
3. Which of these three exercises do you recommend that I do?
   □ Calf stretch in a standing position
   □ Hamstring stretch in a standing position
   □ Hamstring and calf stretch in a sitting position

4. Keep a log of what you do and if you have leg cramps at night. Record how many leg cramps you have. Report to your doctor on your next visit.

5. Studies indicate that if these exercises are followed nightly for a minimum of six weeks, the number of nightly cramps or the intensity of nightly cramps may diminish.

Citations


If you have Sarcopenia, talk to your doctor before beginning a physical activity regimen.

Sarcopenia is an age-related condition resulting in loss of muscle mass and function.

Sarcopenia is not considered a disease. It is a collection of symptoms that lead to functional deficits and loss of strength resulting in an individual’s inability to perform some basic tasks of daily living.

Speak to your doctor about the benefits of resistance/strength training programs and exercises.

**Guidelines**

<table>
<thead>
<tr>
<th>Guideline Component</th>
<th>Guideline Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercises</td>
<td>8 – 10 that target the major muscle groups</td>
</tr>
<tr>
<td>Repetitions</td>
<td>8 – 12 per set. When able to achieve 12 repetitions, increase resistance so that 8 repetitions are possible.</td>
</tr>
<tr>
<td>Sets</td>
<td>Minimum of 1, preferably 2-3 per exercise with 1 -2 minutes rest between sets</td>
</tr>
<tr>
<td>Frequency</td>
<td>1-3 days per week with at least 48 hours between sessions</td>
</tr>
<tr>
<td>Velocity</td>
<td>2-3 seconds concentric and 2 -3 seconds eccentric. Some sets of rapid concentric movements can also be included. Concentric is lifting or pulling Eccentric is smooth and controlled lowering</td>
</tr>
<tr>
<td>Breathing</td>
<td>Normal breathing on each repetition. Do not hold your breath</td>
</tr>
<tr>
<td>Duration</td>
<td>Less than an hour</td>
</tr>
</tbody>
</table>

Discuss with your doctor your duration in the beginning and how many minutes you should add weekly.
**Questions to Ask Your Doctor**

1. Can you give me more information about Sarcopenia?
2. Is it OK for me to do resistance exercises?
   - [ ] Yes
   - [ ] No
3. Should I focus on
   - [ ] Upper body
   - [ ] Lower body
   - [ ] Both
4. Which upper body area should I focus on?
   - [ ] Arm?
   - [ ] Elbow?
   - [ ] Shoulder?
   - [ ] Wrists?
   - [ ] Other Recommendations? ______________________________________________________
5. Which upper body area should I focus on?
   - [ ] Hip?
   - [ ] Knee?
   - [ ] Ankle?
   - [ ] Foot?
   - [ ] Other Recommendations? ______________________________________________________
6. What, if any, exercises should I NOT do?
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
7. I understand I may be sore after the first few times I do this. Can we discuss this?
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
Citations


