FACTORS ASSOCIATED WITH FALL RISK SCORES IN COMMUNITY-DWELLING ELDERLY BLACKS

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ABSTRACT

FACTORS ASSOCIATED WITH FALL RISK SCORES IN
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Falls and the outcomes of falls are a serious concern for the elderly, their families, and the healthcare system. The purpose of this study was to examine factors related to fall risk scores and near-falls in a sample of community-dwelling elderly Blacks. Data were collected from 120 male and female patients, age 65 and older, who self-identified as being Black/African American from two outpatient clinics at Mount Sinai Hospital, NYC: the Martha Stewart Center for Living and Internal Medicine Associates (IMA). The study utilized the Elderly Falls Screening Test (EFST), an instrument that generated a fall risk score as the dependent variable. Predictors assessed were comorbidity (Charlson Comorbidity Index), self-rated health (SRH), falls efficacy (Modified Falls Efficacy Scale), and confidence in performing activities of daily living without falling and physical activity (Rapid Assessment of Physical Activity or RAPA). Covariates included demographic data. Controlling for demographics, all predictors were statistically significant for fall risk scores. Using a backward stepwise regression, falls efficacy

(beta = -.453, $p < .001$) and aerobic physical activity together (beta = -2.35, $p = .005$) constituted the best set of predictors of fall risk score. Those who had lower confidence to do activities of daily living without falling had a higher risk of falling. Those with lower aerobic physical activity levels had a greater risk of falling.

Near-falls is a component of EFST and has not been studied in elderly Blacks. A logistic regression analysis with near-falls as the dependent variable use of an assistive device, gait, physical activity, and time on the observed 5-meter walk (another component of EFST) as predictors and demographics as the covariates, showed that gender and time on the observed 5-meter walk were significant predictors of near-falls (Nagelkerke = .178). In a backward stepwise logistic regression model, only gender and time constituted the best set of significant predictors. Men were 3.675 ($p = .022$) times more likely to experience a near-fall than women. Participants were 1.414 ($p = .001$) times more likely to have a near-fall for each unit increase in time (seconds).

New knowledge on falls, fall risk, and near-falls in elderly Blacks can improve standards of care from assessment, planning, implementation, and evaluation of interventions.

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Chapter I

FALLS AND NEAR-FALLS IN AN OUTPATIENT POPULATION OF ELDERLY BLACKS

The elderly minority population in the United States is expected to increase from 41.2 million to 61.7 million by the year 2060 (Grayson, Velkoff, & U.S. Census Bureau, 2010; U.S. Census Bureau, 2008). As people age, the risk of experiencing a fall or a near-fall experience increases. Falls in the elderly are costly on an individual and societal level (Centers for Disease Control and Prevention [CDC], 2015). The phenomenon has been studied extensively in an elderly White female population but not as extensively in the population of Blacks or males (World Health Organization [WHO], 2010). Falls have been associated with low self-rated health (Biderman, Cwikel, Fried, & Galinsky, 2002). Self-rated health is lower in blacks and Hispanics than Whites (Wolf, Armour, & Campbell, 2008). Kressig et al. (2001) found that elderly Blacks had lower falls efficacy compared to their White counterparts. Falls efficacy is defined as an individual’s perception of his or her self-efficacy to perform certain activities of daily living (ADL) without falling. High falls efficacy scores indicate high confidence in ability to perform activities without falling and low falls efficacy scores indicate fear of falling. In fact, elderly Blacks have fewer documented fall episodes but worse outcomes when they do experience falls. The episodes of documented near-falls are even fewer in published studies of the elderly Black population.

The specific aims of Chapter II are to utilize a literature review to examine the bone structure trajectory of African Americans spanning the life cycle.

The specific aims of this study are as follows:

1. To review the literature on the bone structure of African Americans spanning the life cycle.
2. To examine the relationship of the number of comorbid illnesses as documented through a chart review to the falls risk score as measured by the Elderly Falls Screening Test (EFST).
3. To examine the relationship of falls efficacy as measured by the Modified Falls Efficacy Scale (MFES) to the falls risk score as measured by the EFST.
4. To examine the relationship of self-rated health (SRH) as measured by the single-item index (Stanford University) to the falls risk score as measured by the EFST.
5. To examine the relationship of physical activity as measured by the Rapid Assessment of Physical Activity (RAPA) to the falls risk score as measured by the EFST.
6. To determine the best set of predictors of fall risk score.
7. To determine the best set of predictors of near-falls.

Changes in the Proposed Study

The first change to the initial proposal was a change in sample size required. In the initial proposal, the sample size was estimated using G-power to be 234 (Faul, Erdfelder, Buchner, & Lang, 2009). Of that number, a minimum of 117 who were classified as fallers were to be recruited. The remaining 117 would have been classified as non-fallers. This was based on an anticipated effect size (Cohen's d) of 0.3686, a desired statistical power of 0.8 and probability, *p*-value alpha or type I error rate of 0.05.The power analysis was based upon an examination of sample sizes and participant characteristics, statistical analyses, and effect sizes of predictor variables in studies that addressed questions similar to the proposed study. Sample size was determined by the calculator, http://www.campbellcollaboration.org/exscale/html/EffectSizeCalculator-SMD1.php, where possible effect sizes were used to compute power based on prior studies. However, this proposed number was presented before the nursing research committee at the Mount Sinai Hospital, the proposed institution where the study was to be conducted. After consultation with Dr. Carol Porter, chief nursing officer and head of the committee, it was accurately determined that getting that number of participants from that population would be a challenge. The majority of patients were non-fallers, with the trend continuing in that direction as the study progressed. If that trend continued, regardless of how many participants were recruited, it was highly unlikely in this population that half would be fallers.

Another change to the initial proposal was the addition of another site within the institution. The Internal Medicine Associates (IMA) clinic was added to the proposal, which required an addendum to the IRB at Mount Sinai as well as at Teachers College. Adding the IMA clinic would increase the probability of getting more participants in the study.

To address the assessment of physical activity using RAPA, Specific Aim 5 was added. Studies have shown that elderly Blacks have increased sedentary behaviors and low levels of physical activity (Brownson et al., 2000). This study investigated the relationship between activity and fall risk scores in this population. To identify ways to guide healthcare providers in their assessment of their elderly patients, Specific Aim 6 was added.

Since the EFST addresses the frequency of near-falls and participants identified themselves as experiencing more near-falls in the past year than falls, near-falls was added as a dichotomous, dependent variable, to be addressed in Chapter III. The analysis of this dependent variable required a change in analysis from linear to binary logistic regression.

This dissertation is composed of a total of five chapters. Chapter I was an introduction to the topic, the specific aims of the study, and changes made to the proposal since it was accepted and approved. Chapters II, III, and IV were designed to be separate manuscripts that can be submitted for publication. Chapter V is a summation of the work presented.

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Chapter II

AFRICAN AMERICANS' BONE STRUCTURE TRAJECTORY

Compared to Whites, African Americans have high bone density despite low intake of calcium and Vitamin D (Aloia, 2008) across much of the lifespan. In the elderly, protective mechanisms appear adequate for a time, but may not be sufficient to protect elderly African Americans after the age of 75. The purpose of this paper is to explore the compensatory mechanisms seen in African Americans' bones from childhood to old age and how osteoporosis affects their bones in old age. These compensatory mechanisms help African Americans retain calcium through kidney reabsorption and skeletal resistance to bone resorption.

Changes in Bones Across the Lifespan

Bone Density and Structure From Childhood to Adolescence

Bone density and mass differences between African Americans and Whites are evident in early childhood. In a comparative study of 312 healthy and 23 obese children and adolescents, differences in bone mineral density index (BMDI), which is bone mineral density/weight, were seen as early as the age of 5 at the lumbar spine of African Americans (McCormick, Ponder, Fawcett, & Palmer, 1991). Another comparative study (Bell et al., 1991) showed that African American children between the ages of 7 and 12 had higher BMD and that 49-66% of the BMD variance could be attributed to race, age, sex, and body weight. African American boys had greater BMD compared to White boys and girls at multiple areas including the lumbar spine, trochanter, femoral neck, and mid-radius. BMD was positively correlated with increased body weight and increased age.

Aloia (2008) cited a comparison study done by Bryant, Wastney, and Martin (2003) on African American and White girls. The findings of this study showed that compared to White girls of the same age and matched for weight, African American girls had better calcium absorption and retention, increased renal conservation of calcium, lower urinary excretion of calcium (Aloia, 2008), and lower serum 25 hydroxy-Vitamin D or 25(OH) D concentration. Relatively high parathyroid hormone (PTH) concentrations in Blacks help balance the actions of the kidney to maintain homeostasis and counter the effects of calcium resorption on the bones. To simplify, Vitamin D exists in two forms: Vitamin D2 or ergocalciferol and Vitamin D3 or cholecalciferol. Vitamin D3 is metabolized in the liver to 25 hydroxy-Vitamin D or 25(OH) D, which is further broken down to 1,25 (OH)2 D, the most active metabolite whose conversion is regulated by PTH. With PTH, there is an inverse relationship that exists with calcium. As PTH level increases, calcium level in the blood decreases via excretion from the kidneys up to approximately age 50. In African Americans, elevated PTH is protective and allows them to have lower bone turnover markers up to that point (National Osteoporosis Foundation, 2012a, 2012b). However, Aloia (2008) indicated this protective pattern may not hold true for elderly African Americans.

Research done by Yeh et al. (2013) in a racially diverse population indicated that African Americans over the age of 50 had the highest PTH and calcium levels compared to Whites, Asians, Hispanics, and others, and those levels increased with advancing age. Elevated calcium in the blood given off from the bones can result in kidney damage (stones), low bone mass (osteopenia), and osteoporosis in the elderly population. Compared to Whites, African Americans have the highest age-adjusted incidence of primary hyper parathyroidism; the age-adjusted incidence of cases for African American women was 92, 46 for African American men (per 100, 000-person years, $p < .0001$) and 81 for White women, 29 for White men (Yeh et al., 2013). The prevalence of primary hyperparathyroidism was also higher in elderly Blacks compared to elderly Whites. Among elderly Black women, 921.5 per 100,000 in the 70-79 years age group compared to 630.3 per 100,000 White women ($p < .0001$). For Black men aged 80 and above, the prevalence was 481.1 per 100,000 compared to 164.7 per 100,000 ($p < .0001$) White men. Yeh et al. (2013) defined primary hyper parathyroidism as a serum calcium >10.5 mg/dL and a PTH level >65 pg/mL. Normal PTH level is 15-65.

Bone Density and Structure in the Young and Middle Adult

Young and middle adulthood spans ages 20-40. As much as 75% of the Black population and 53% of the Hispanic population are lactose intolerant, which in turn inhibits or limits the ability of the body to absorb calcium (Geller & Derman, 2001). Forty-nine percent of African Americans experienced some physical discomforts after consuming dairy products and 24% identified themselves as having lactose intolerance (Keith, Nicholls, Reed, Kafer, & Miller, 2011). Lactose intolerance occurs when there is a deficiency of the enzyme lactase, which is needed to assist in the digestion of lactose, the sugar found in milk/dairy products. Individuals with this condition have varying levels of intestinal discomfort after ingesting milk or dairy products (National Institute of Health Osteoporosis and Related Bone Diseases National Resource Center, 2012). The most commonly experienced form of lactose intolerance is primary lactase intolerance.

This can be experienced as early as the age of 2; children may or may not be symptomatic or symptoms may appear later on in life (National Institute of Diabetes and Digestive and Kidney Diseases, 2014).

Because most calcium in the American diet comes from milk and milk products (American Academy of Pediatrics, 2014), African Americans with lactose intolerance consume up to 50% less calcium than the recommended daily allowance (RDA). In a study comparing consumption of calcium in African Americans and Whites, Keith et al. (2011) cited findings of the National Health and Nutrition Examination Survey (NHANES), which found that the mean calcium intake for Black males was 623 mg/day and 514 mg/day for Black females. For Whites, calcium intake was 964 mg/day for White males and 740 mg/day for White females. Total dairy intake or servings/day for Black males was 0.86 and 1.78 for White males. For Black females, daily intake of dairy products was 0.73 and 1.39 for White females. Low concentrations of 25 hydroxy-Vitamin D, from low dietary intake of Vitamin D, which in the American diet is ingested in milk that is fortified with Vitamin D, inhibit the body's ability to absorb calcium. Keith et al. (2011) demonstrated that when compared to Whites, African Americans' intake of dairy foods 1-3 times/day was significantly lower than Whites (41% vs. 53%). Intake of dairy products at least once daily was significantly lower among African Americans compared to Whites (29% vs. 43%). African Americans experienced greater physical discomforts (49%) compared to Whites (31%) from ingestion of dairy products.

Low levels of circulating Vitamin D and the presence of other diseases such as multiple sclerosis (MS), sickle cell disease (SCD), systemic lupus erthymatosis (SLE), diabetes mellitus (DM), rheumatoid arthritis, certain cancers, and hyperparathyroidism may increase the risk of loss of bone and fractures. These conditions and the treatments used to manage them, particularly steroids, often weaken bones (National Institute of Health Osteoporosis and Related Bone Diseases National Resource Center, 2012; National Osteoporosis Foundation, 2011, 2012a, 2012b; Thomas, 2007).

The presence of higher levels of melanin in African Americans, responsible for skin pigmentation, may interfere with the conversion of proVitamin D3 to preVitamin D3 (National Osteoporosis Foundation, 2012a, 2012b). Melanin blocks ultraviolet light (UVB). The darker the skin complexion, the more sun individuals need to absorb Vitamin D.

Bone Mineral Density and Structure in the Menopausal and Postmenopausal Adult

BMD loss occurs in all women in late perimenopause, but is slowest in African American women during the peri- and postmenopausal period. In a longitudinal cohort study of African American, White, and Chinese/Japanese women, researchers found that ethnicity, baseline weight, and changes in baseline weight were associated with lumbar spine BMD. African American women were 9 kg heavier than Whites and were 26-27 kg heavier than the Chinese/Japanese women. Loss of BMD occurred in late perimenopause across all ethnic groups, but was most rapid among Japanese/Chinese women, followed by Whites and lastly by African American women ($p < .001$). Where there was significant overlap of ethnicity and weight, ethnic differences were eliminated in late peri- and postmenopausal groups ($p = 0.37$ and $p = 0.11$). There was significant ($p < 0.001$) differences in spinal BMD loss across weight tertiles. The loss of BMD was most rapid among women in the lowest tertile and slowest among women in the highest tertile (Finkelstein et al., 2007).

Bone Changes in the Elderly/Older Adult

After the age of 75, African Americans' risk of fracture after falls dramatically increases compared to other ethnic groups (Aloia, 2008). The increased bone mass that was protective for African Americans in younger age groups dramatically decreases after African Americans pass the age of 75, with bone loss that accelerates at a rate that is faster than that which occurs in Whites (Aloia, 2008). In a comparative study of African American males and females to Caucasian American males and females, researchers examined the cortical ribs from 199 cadavers and found that European American males kept bone mass while African American elderly females lost bone mass the most rapidly (Cho, Stout, & Bishop, 2006). The African American sample had an age range from 17-95 years and a mean age of 54.3 years. The White sample had an age range from 17-102 years and a mean age of 43.8 years. In this study, the pattern of increased bone mass continues for African American females until their 70s, while little to no change due to age occurs in European American males, and decreases related to age are evident in remaining groups in the study.

Disparities in Screening

Black women were less likely than a comparative group of White women to be screened and treated for osteoporosis. A comparative study of Black and White females to determine bone mass measurement and treatment found that African Americans reported fewer osteoporosis interventions even with a reported fracture history. Odds of receiving bone mineral density (BMD) testing and prescription treatment for African Americans were two-thirds lower than for Whites (Mudano et al., 2003). After adjustment for confounders such as age, weight, income, menopausal status, smoking, steroid usage, fracture history, and time a physician was last seen, African Americans still had a 50-65% lower chance of receiving BMD testing than Whites. Researchers Wilkins and Goldfeder (2004) noted a pattern of underdiagnosis and undertreatment of osteoporosis in non-Caucasians; they pointed out that advancing age was the major risk factor for development of osteoporosis and that alone crossed ethnic and racial barriers. Guidelines for diagnosing and treating osteoporosis were based on guidelines established using postmenopausal White women as the standard. Although their study of 252 women, (214 of them African American) showed White women with a higher percentage of abnormal BMD compared to African American women (53.3% vs. 40.4%), the difference they found was not statistically significant. However, at the 6-month follow-up, out of 57 abnormal peripheral BMD tests, only 9 or 16% African Americans had central BMD follow-up. Of the 9 African American women, 5 had osteoporosis, 3 had osteopenia, and 1 had a normal BMD, a change from a previous borderline osteopenia diagnosis on peripheral tests. Wilkins and Goldfeder did not specify how many White women were followed up in their study.

Screening is important as it identifies problems at the earliest stages. African Americans should be screened later in life for osteoporosis. This benefits the individual, families, and society at large. For example, early screening for osteoporosis can result in treatment with bisphosphonates such as alendronate (Fosamax), risedronate (Actonel), and ibandronate (Boniva). Nonpharmacological interventions include increasing weight-bearing activities and involvement in patient education on injury prevention strategies.

Osteoporosis

Osteoporosis is an asymptomatic disease; people usually do not know they have it until they have broken a bone. It is a disease associated with elderly women but can occur in anyone past the age of 50 of both sexes. It is defined as a disease that weakens bone density, and internal structure as calcium that is lost is not replaced as quickly and bones become weakened and brittle. Weakened bones can break as a result of a minor fall, or in severe cases of osteoporosis, bones can be so fragile that they can break as a result of reaching, sneezing or bumping into something. Osteoporosis-related fractures were responsible for $11 billion in healthcare costs for hip fracture. It is predicted that there will be 2 million fractures per year secondary to osteoporosis, with an increase to 3 million per year by the year 2025 (American Academy of Orthopedic Surgeons, 2009).

Osteoporosis was the cause of over 2 million fractures in 2005. The distribution of fractures in that year was as follows: hip 297,000, with 293,000 of these resulting in hospitalization for fractures of the femoral neck. Vertebral fractures numbered 547,000; wrists 397,000; pelvis 135,000; other sites 675,000 (National Institute of Health Osteoporosis and Related Bone Diseases National Resource Center, 2012; National Osteoporosis Foundation, 2011).

Osteoporosis is estimated to affect 5% of African American women over the age of 50. Thirty-five percent of African American women over age 50 who have osteopenia are not even aware they have low bone mass or osteopenia (National Institute of Arthritis and Musculoskeletal and Skin Diseases, 2012; National Osteoporosis Foundation, 2012a, 2012b). By comparison, osteoporosis is estimated to affect 20% of White women over age 50, with over half having osteopenia (National Osteoporosis Foundation, 2012a, 2012b).

While falls, hip fracture, and osteoporosis rates are higher among elderly Whites, elderly African Americans were three times more likely to die within 3 years of sustaining an osteoporotic fracture than were Whites and were more likely to be nonambulatory post-hip fracture (Woodson, 2004). White women have an increased hip fracture rate compared to Black women; however, "the hip fracture rate for black females doubles for each additional 7 years of life," especially after the age of 70 (National Institute of Arthritis and Musculoskeletal and Skin Diseases, 2012).

The contradiction. In terms of osteoporosis, being overweight can help and hurt African Americans. The extra weight that African Americans carry acts as padding or cushioning for falls. Estrogen is stored in adipose tissue and is protective of bones. Added weight can increase weight bearing and therefore is beneficial to bone density. However, being overweight increases risk for cardiovascular disease, diabetes, and osteoarthritis and an increased disease burden (Aloia, 2008). African Americans may need Vitamin D, the sunshine vitamin, but age-related thinning of skin inhibits the effective absorption of Vitamin D (Nair & Maseeh, 2012). Diminished mobility may interfere with African American elderly getting outdoors, further hindering the ability of the sun to aid in absorption of the vitamin.

Implications for Practice

African Americans start off with stronger bones due to a combination of heredity and compensatory biological mechanisms that permit them to retain BMD, despite low intake of calcium and Vitamin D-enriched foods, often found in dairy products. These dairy products often produce lactose intolerance and a subsequent avoidance by African Americans. During adulthood, the compensatory mechanisms of the body continue as the body holds on to calcium by increased renal conservation and decreased excretion. The situation reverses with the aging process, starting at or around the time of menopause, which happens to all women. Thereafter, bone loss begins and continues as the body changes and compensatory mechanisms reverse or fail. At approximately the age of 50, gradual changes in the bone trajectory, combined with the possible presence of comorbid illnesses and treatments used to address these illnesses, may play a role in contributing to the decline in bone health. After the age of 75, bone loss accelerates in African Americans, erasing the compensatory mechanisms of their younger years.

Primary healthcare providers can take the opportunity to give their African American patients of all ages dietary guidance that includes nondairy food sources of calcium and Vitamin D supplementation. It is important that healthcare providers take into consideration cultural preferences when teaching patients about diet. When patients' needs are included in the teaching plan, patients become a part of the teaching and learning experience and feel respected. Teaching patients about the importance of weight-bearing exercises to increase bone strength should be a part of that dialogue. Early education on how nondairy, dietary sources of calcium and supplementary Vitamin D in young adults works to maintain a healthy weight and lifestyle is essential for a healthy life. Early diagnosis and treatment to identify people over the age of 50 who may have osteopenia or low bone mass are essential to prevent fractures and the negative outcomes of fractures. Bone mineral density testing should be a part of routine testing of all women over the age of 65, regardless of race, as the standard of care. It is important that healthcare providers and patients take a proactive approach to prevent the negative consequences associated with falls and fractures.

Strengths

This review identified a critical point in African Americans' bone structure trajectory at which they are most vulnerable. The postmenopausal period, which occurs at or around the age of 50, presents a time when screening for bone mineral density should begin. Healthcare providers need to be aware that all women are particularly vulnerable at this time. Early benefits of increased bone mass and denser structure start an insidious reversal. Another strength of this review is that it highlighted low intake of calcium in this ethnic group. Teaching strategies need to include methods to help patients increase their intake of nondairy sources of calcium and calcium and Vitamin D supplementation. This literature review identified the need for healthcare providers to adapt information given to patients to fit their racial and ethnic identity and needs.

Limitations

This review is limited by the number of comparative studies done among African Americans and bone health. More comparative studies are needed to learn more about the influence of medical interventions as they affect the aging African American population's bone health and improve fracture outcomes.

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Chapter III

FACTORS ASSOCIATED WITH FALL RISK SCORES IN COMMUNITY-DWELLING ELDERLY BLACKS

The World Health Organization (WHO) (2010) defined a fall as “inadvertently coming to rest on the ground, floor, or other level, excluding intentional changes in position to rest on furniture, the wall or other objects” (p. 6). Fall-related injuries or injurious falls were defined as any fall resulting in dislocations, fractures, chest, abdominal or pelvic injury, a wound requiring medical intervention, bruises or scrapes, joint injuries or any crushing nerve or spinal cord injury (Li et al., 2005). Near-falls, stumbles, and missteps have been described as slips (sliding of the supporting leg), trips (the swinging leg impacts an object), or losses of balance in which a person is able to prevent himself/herself from hitting the floor or ground (Arnold & Faulkner, 2007) and may be more common than falls but not as extensively studied in the elderly.

According to the Centers for Disease Control and Prevention (CDC, 2015), falls in those age 65 and older were the leading cause of injury-related death and nonfatal trauma-related hospitalization. As people age, their risk of experiencing a fall increases. By 2012, there were 722,000 hospital admissions for fall-related injuries, with 2.4 million elderly receiving treatment in emergency departments (EDs) nationwide. Yearly, one out of three elderly (defined as age 65 and older) experience a fall, with falls being five times more likely to result in hospitalization compared to any other cause (CDC, 2015).

Fractures are the most common outcome of falls, accounting for 61% of total costs or $18.8 billion dollars. Hip fractures resulted in 258,000 hospitalizations in 2010. The CDC projects that by the year 2030, there will be 289,000 hip fractures, a cost that Medicare estimates to be $2.9 billion. Approximately 95% of falls among the elderly resulted in hip fractures, a major cause of loss of independence because of admission to nursing and rehabilitation facilities (CDC, 2015).

Although Blacks have higher bone mineral density than Whites throughout most of their lifetimes because of genetic factors and biological compensatory mechanism, this advantage begins to reverse after age 50 and is lost after age 75. Elderly Blacks were three times more likely to die within 3 years of sustaining a fracture than were Whites (Woodson, 2004). Compared to Whites, elderly Blacks also have increased disability, decreased survival rates due to increased number of comorbid diseases (Bohannon, 1999; National Institute of Arthritis and Musculoskeletal and Skin Diseases, 2012), as well as underdiagnosis and undertreatment of osteoporosis (Wilkins & Goldfeder, 2004). Moreover, compared to Whites, Blacks have other risk factors for falls and fractures, including lower physical activity levels and more sedentary behaviors (Brownson et al., 2000), slower functional obstacle course (FOC) completion times, greater neurological abnormalities, and lower efficacy for carrying out daily activities without falling (Means, Rodell, & O'Sullivan, 2005). Low falls efficacy describes fear of falling or individuals' perceptions that their self-efficacy to perform nonthreatening activities of daily living (ADLs) without falling is low (Tinetti, Richman, & Powell, 1990). These are all risk factors putting Blacks at increased risk of falling compared to their White counterparts. However, Blacks have fewer documented fall episodes than Whites, a paradox not explained by the literature since much of the research has been done on White females, with other racial groups and males poorly represented (WHO, 2010). One possible explanation for fewer documented fall episodes could be the reluctance of Blacks to participate in research because of a long-standing feeling of mistrust going back to the Tuskegee Syphilis Study, a general feeling of being used as “guinea pigs” by researchers, and a sense that findings will not be used to help members of the Black community (Corby-Smith, Thomas, Williams, & Moody-Ayers, 1999). This study, done by an African American principal investigator, focused on elderly Blacks attending two clinics near Harlem in New York with the hope of attracting a sizable sample to investigate important predictors of falls in this understudied population.

Significance

Increased Prevalence of Falls

Falls and the outcomes of falls on the elderly population are of increased concern for all healthcare providers, as the elderly population is expected to increase substantially in size and ethnic/racial diversity over the next few years. Minorities, who currently make up approximately one-third of the population, are expected to become the majority by the year 2042 and make up 54% of the population by 2050. The Black population is projected to increase from 41.2 million or 14% of the population to 61.7 million, to 14.7% in 2060 (Grayson, Velkoff, & U.S. Census Bureau, 2010; U.S. Census Bureau, 2008). In terms of ethnic and racial diversity, these projections indicate an increased need for healthcare for minorities as their population numbers increase, with that care coming from providers of similar ethnic and racial backgrounds as well as those with an increased awareness of cultural practices and preferences and the roles such practices and preferences play on health care usage (Turano, Rubin, Herdman, Chee, & Fried, 1994).

Direct Costs of Falls

According to the CDC (2015), in the year 2012, the direct costs to the U.S. healthcare system for the treatment of nonfatal falls among the elderly was over $30 billion. In the year 2013, the direct costs increased to $34 billion. By the year 2020, yearly costs, including direct combined with indirect costs, is projected to reach $67.7 billion yearly (CDC, 2015). The direct costs of falls among the community-dwelling elderly are the greatest expense. Sixty-five percent of the money spent was for direct medical care expenditures such as hospitalization, with the average cost per person for hospitalization reaching $35,000 (CDC, 2015).

Indirect Costs of Falls

Indirect costs include fear of falling, decreased quality of life, dependence and disability, decreased mobility, and time lost by the individual and their caregiver(s) (CDC, 2015). When elderly are fearful of falling, they tend to limit their activities and social contacts, discontinue activities once pleasurable to them, and become depressed and dependent on others to do essential things such as shopping, cooking, house cleaning, and self-care. Falls and fear of falling can affect the health and lifestyle of the elderly; considering the large numbers of individuals involved, it is an important concern in society (Carroll, Slattum, & Cox, 2005; James, Eldemire-Shearer, Gouldbourne, & Morris, 2007).

Racial Differences in Diseases and Conditions That Increase Falls Risk

All races are at risk for falls and fractures. Old age and low body mass index (BMI) are factors crossing racial/ethnic boundaries (Wilkins & Goldfeder, 2004). White women have an increased hip fracture rate compared to Black women; however, “the hip fracture rate for black females doubles for each additional 7 years,” especially after the age of 70 (National Institute of Arthritis and Musculoskeletal and Skin Diseases, 2012). Elderly Black women are more likely to die following a hip fracture compared to White women (Thomas, 2007), and are also more likely to be nonambulatory post-hip fracture.

Diseases such as systemic lupus erythematosus (SLE), multiple sclerosis (MS), sickle cell disease (SCD), lactose intolerance, and Vitamin D deficiency have been shown to increase the risk of osteoporosis in Blacks (Thomas, 2007). Osteoarthritis of both knees and hips are more commonly found in Blacks compared to Whites. Blacks also have lower rates of total knee and hip replacement, even after adjusting for age, sex, and insurance coverage (Thomas, 2007). Blacks are more likely to have higher body mass index (BMI), which puts added stress on knees and hips. These conditions and the treatments used to manage them, particularly steroids, increase osteoporosis risk. Osteoporosis can go undiagnosed unless there is a fall-related fracture in minorities, and osteoporosis is a contributor to 80-95% of fractures in Blacks over the age of 64 (Thomas, 2007).

Multiple sclerosis (MS), a disease 2-3 times more common in women, has a secondary complication of premature osteoporosis. Leading a sedentary lifestyle, corticosteroid use and menopause have been identified as risk factors for MS (Shabas & Heffner, 2005). Among Blacks, there is greater disease-related disability from MS despite the disease being more common in Whites of northern European ancestry, regardless of promptness of diagnosis and treatments, and despite younger age at diagnosis, shorter disease duration, and type of treatment.

Sickle cell disease (SCD) is a complex, inherited disorder of the hemoglobin molecule of the blood. Some of the complications of this disorder affecting the skeletal structure include osteomyelitis, necrosis osteopenia, and osteoporosis. In a retrospective chart review of 103 Black patients ranging in age from 18-80 years, abnormal BMD was prevalent in 79.6% of this population, with females more likely having abnormal BMD (Sarrai, Duproseau, D'Augustine, Sabita, & Bellevue, 2007).

Studies have shown that Blacks are more likely to suffer from lactose intolerance and therefore consume up to 50% less calcium than the recommended daily allowance (RDA). As many as 75% of the Black population and 53% of the Hispanic population are lactose-intolerant, which in turn inhibits or limits the ability of the body to absorb calcium from dietary intake of dairy products (Geller & Derman, 2001). Forty-nine percent of Blacks experienced some physical discomforts after consuming dairy products and 24% identified themselves as having lactose intolerance (Keith, Nicholls, Reed, Kafer, & Miller, 2011).

Another comorbidity more prevalent in Blacks is stroke. Blacks have double the rate of first-time stroke compared to Whites, with Blacks being more likely to die earlier in life from a stroke than Whites. Among the 20-44 year age groups, Blacks have 2.4 times the likelihood of a stroke compared to Whites, with Black women’s survival time of 1 year poststroke lower than that of Whites. Reasons for increased risk include obesity, high blood pressure, sickle cell disease, diabetes, and smoking (National Stroke

Association, 2011). Stroke was identified as one of several predictors of frequent falls among community-dwelling elderly in a literature review (Masud & Morris, 2001) and in a comparative study (Quandt et al., 2006). People who have had a stroke are at increased fall risk, particularly postdischarge from the hospital due to poor ability to catch themselves from falling because of weakened upper extremity function (Forster & Young, 1995; Quandt et al., 2006).

When compared with Whites, prevalence of frailty was greater among African Americans across all age categories, especially ages 65-74. In the Hirsch et al. (2006) study, frailty was measured using five frailty parameters: lowest quintile for grip strength; moderately to mostly feeling exhaustion; unintended weight loss of 10 or more pounds in the past year; slowness in walking 15 feet; and lowest quintile of kilocalories expended/week. In their study of African American and White Cardiovascular Health Study (CHS) participants, researchers (Hirsch et al., 2006) found upon study entry that 8.7% and 15% of African American men and women, compared to 4.6 and 6.8% of White men and women, were frail. African Americans had a higher prevalence of impairments of instrumental activities of daily living (IADLs) and were twice as likely to be dependent on others for basic activities of daily living (BADLs). This may be contributing to Blacks' diminished activity levels since other people may be performing activities for them.

Poor self-rated health status has been associated with fear of falls. Biderman, Cwikel, Fried, and Galinsky (2002) found that poor self-rated health was one of five risk factors distinguishing fallers from non-fallers. Poorer self-rated health is an independent predictor of morbidity and mortality, and is found to be more prevalent in Blacks than in

Whites (Wolf, Armour, & Campbell, 2008), but little research is available on its relationship to falls in Blacks.

Comorbidity indexes have been used to predict disease burden among populations and to predict health care expenditures for resource utilization. This study examined the factors linking falls in elderly Blacks and comorbidities using the Charlson Comorbidity Index (CCI). Falls efficacy or the ability to perform ADLs without fear of falling is lower among elderly Blacks compared to elderly Whites, particularly for those who walk slowly and use an assistive device (Kressig et al., 2001). These areas need to be addressed in studies of elderly community-dwelling Blacks.

Specific Aims

The aims of this study are as follows:

1. To examine the relationship of the number of comorbid illnesses as documented through a chart review to the falls risk score as measured by the Elderly Falls Screening Test (EFST).
2. To examine the relationship of falls efficacy as measured by the Modified Falls Efficacy Scale (MFES) to the falls risk score as measured by the EFST.
3. To examine the relationship of self-rated health (SRH) as measured by the single-item index (Stanford University) to the falls risk score as measured by the EFST.
4. To examine the relationship of physical activity as measured by the Rapid Assessment of Physical Activity (RAPA) to fall risk score as measured by the EFST.
5. To determine the best set of predictors of fall risk score.

Method

Design

This study used a cross-sectional, retrospective, correlational design.

Participants

The sample included men and women aged 65 and older who identified themselves as Black or African American. The Merriam-Webster online dictionary (2011) defined African Americans as persons born in the United States with African, particularly Black African, ancestry. Since this study examined falls and near-falls in elderly Blacks, elderly of other races were excluded. A total of 120 participants were obtained for the main study to address the specific aims.

Inclusion Criteria

Study participants were community-dwelling elderly who were ambulatory with or without assistive devices to aid with physical or sensory deficits, such as canes, walkers, eyeglasses, or hearing aids. Participants had to speak and understand English and respond to questions posed by the researcher. Study participants were age 65 and older, racially self-classified as either Black/African as defined above and able to complete the informed consent and demonstrate to the principal investigator competence and understanding, i.e., the ability to verbalize understanding of what they were being asked to do as part of this study, and the ability to return the explanation to the researcher.

Exclusion Criteria

Excluded from this study were the following: men and women less than 65 years of age, prisoners, inpatients, bed-bound, nonambulatory (wheelchair-dependent), those completely dependent on others for ADLs, those unable to understand the informed consent, and those classified as being unable to give informed consent.

Instruments and Measures

The instruments used are described in Table 3.1 and include the Modified Falls Efficacy Scale (MFES), the Elderly Falls Screening Test (EFST), the Rapid Assessment of Physical Activity (RAPA), a basic demographic assessment questionnaire, and the Stanford University single-question self-rated health (SRH) status assessment. Although the assessments, which were administered by the principal investigator, were estimated to take 30 minutes, on average, they took 20 minutes from start to finish per participant.

The Modified Falls Efficacy Scale (MFES). The MFES (Hill, Schwarz, Kalogeropoulos, & Gibson, 1996) is a 14-item scale and is based on the original version of the Falls Efficacy Scale (FES) (Tinetti et al., 1990), which is based on Bandura's theory of self-efficacy. Although fear of falling is sometimes found to be a predictor of falls, the approach taken by the creators of this scale differed from the simple assessment of presence or absence of fear in favor of an assessment of clients' feeling of self-efficacy in performing certain activities without falling. The original ADLs were chosen via a survey of health professionals who worked with the elderly in the study population. Response alternatives to the items range from 0 to 10, with 0 representing total lack of confidence and 10 representing complete confidence. Fear of falling was operationalized as low self-perceived self-efficacy to perform basic activities without falling. The

Table 3.1

Instrumentation for Actual Study

Instrument	Description	Measures	Published/Pilot Study Time
Modified Falls Efficacy Scale (MFES)	14 items, responses from 0-10 with 0 = no confidence and 10 = complete confidence	Efficacy in being able to complete activities without falling.	Less than 5 minutes/3-4 minutes
Elderly Falls Screening Test (EFST)	5 questions: 1-3 self-report; 4-5direct observation by the assessor(s)	Falls/near-falls; gait style; walking speed.	5 minutes/3 minutes
Demographic assessment	10 items	Age, gender, marital status, education, employment, household income, ethnicity, race	5 minutes/3-4 minutes
Self-rated health	1 question, 5 possible answers	Self-rated health	1 minute
Rapid Assessment of Aerobic Physical Activity (RAPA1)	1-7: yes/no response,	Levels of physical activity	“short”; pilot study times 1-5 minutes
Rapid Assessment of Physical Activity Strength (RAPA2)	2 items (question 8-9) answer one or the other or both	Flexibility and strength	Less than 1 minute
Charlson Comorbidity Index (CCI)	18-items: yes/no answer from a checklist; higher score more conditions	Comorbid illnesses	5-10 minutes chart review for presence or absence of any of the 18 items identified in the CCI

arguments offered by the authors in favor of the self-efficacy-based self-assessment included the following: it was based on a well-known theory of self-efficacy; self-efficacy had been previously measured successfully in other disciplines; and self-efficacy does not have the same negative, emotional connotation that fear has. Moreover, low self-efficacy has been previously shown to be linked to functional decline. High scores mean the elder is completely confident in performing the activities and low scores indicate the elder has low confidence in completing the activities without falling. The MFES has a Cronbach’s alpha of .95, with an intraclass correlation coefficient (ICC) of .93. Hill et al. (1996) obtained a mean score for healthy participants of 9.76, with a standard deviation of .32. Among participants referred to a multidisciplinary falls and balance clinic, the mean score was 7.69, with a standard deviation of 2.21. For this study, the Cronbach’s alpha obtained by this researcher was .939.

Elderly Falls Screening Test (EFST). Falls, near-falls, and fall circumstances both with and without injuries were assessed over the past year with the Elderly Falls Screening Test (EFST) (Cwikel, Fried, Biderman, & Galinsky, 1998). EFST is a 5-item instrument used with community-dwelling elderly to divide them into two groups: low risk of falling and high risk of falling. Items 1-3 in Part 1 of this instrument are self-report and items 4 and 5 on Part 2 of this instrument are direct observations. The five items on the test are as follows: presence of zero or one fall vs. 2 or more falls in the previous year; no injury or no fall/any injury in the previous year; report of near-falls never or rarely vs. occasionally or frequently; a walking speed of >10 seconds over 5 meters and an unsteady gait. Gait should be steady, even, and symmetrical, straight and non-veering, and with feet that clear the floor with each step. Each positive response is worth 1 point.

Scores can range from 0-5, with 0 indicating no risk and 5 indicating high risk of falling. Test-retest reliability over 1 year was 0.40, positive predictive value was 66.7%, sensitivity was 83%, and specificity was 69%. Predictive ability for most fall-related parameters was described as excellent (RR > 3.0) and for near-falls and injurious falls as good (RR > 1.5). Relative risk is described by Cwikel et al. (1998) as the ratio of incidence rate of falls and slow speed of walking (adverse effects) among those with high fall risk scores to those with low risk scores.

Interrater reliability procedures for gait observations of the EFST were carried out with potential data collectors for this study. It was anticipated that multiple observers/ screeners would be scoring the EFST. Cohen's Kappa was utilized to calculate interrater reliability. Prior to the initiation of this study, the researcher and the team assisting in data collection, who are trained in the administration of all the instruments associated with this study, independently screened/observed 30 volunteer staff members of Mount Sinai Hospital perform the 16.4-foot walk. The results of the observation were used to compute Cohen's Kappa on each of five assessment factors: even/uneven, straight/veering, normal/wide width, raised/shuffling, steady/unsteady. Cohen's Kappa was .909. The code "uneven" refers to unequal time spent on each foot. A code of "veering" refers to the inability to walk in a straight line such as the lines of the tiles on the floor. A code of "wide" refers to steps wider than standard tiles seen on the hospital floor. A code of "unsteady" refers to fluctuating, nonuniform or uneven gait.

Demographic data. This questionnaire is a 10-question assessment of demographic characteristics such as age, gender, marital status, highest educational level, achieved employment status and employer type, household income, ethnicity, and race.

Rapid Assessment of Physical Activity. RAPA is a brief, 9-item, easily administered instrument specifically used in adults age 50 and older. It assesses physical activity, strength training, and flexibility. It takes approximately 5 minutes of their time and has been compared to other assessments of physical activity such as Patient-Centered Assessment and Counseling for Exercise (PACE), Behavioral Risk Factor Surveillance Survey (BRFSS), and Community Health Activities Model Program for Seniors (CHAMPS) in terms of reliability, validity, and responsiveness (Topolski, LoGerfo, Patrick, Williams, & Walwick, 2006). Using both picture depiction and words, RAPA defines three levels of physical activity: light, moderate, and vigorous. Light activity is defined as activities causing a slight increase in the heartbeat while still allowing one to talk and sing. These activities include leisurely walks, vacuuming, or light yard work. Moderate activities are activities that cause the heartbeat to increase a lot while allowing for talking but not singing. Examples of such activities include a fast walk, a gentle swim, an aerobics class, and strength training. Vigorous activities are defined as activities in which the heart rate increases a lot and one’s activity is interrupted by the necessity to take in deeper breaths. Examples of such activity include: jogging or running, using a stair climber, participating in tennis/badminton or racquetball/pickle ball. RAPA was found to have a sensitivity of 81%, a specificity of 69%, a positive predictive value of 77%, and a negative predictive value of 75%. Sensitivity, specificity, positive predictive value, and negative predictive value on the comparison instruments (BRFSS and PACE) were: 70%, 73%, 78%, and 65% vs. 75%, 63%, 71%, and 67%, respectively. RAPA was found to have the best sensitivity and negative predictive value for predicting scores on the CHAMPS physical activity of the instruments being compared. For this study, RAPA1 had a Cronbach's alpha of .474; RAPA2 had a Cronbach's alpha of .501. The instrument is scored separately, hence the separate alphas. These values are low. There are no reported Cronbach's alpha levels on this instrument in other studies.

Self-rated health status. Self-rated health status was assessed with the single-item research instrument used by Stanford University Patient Education Research Center (Lorig et al., 1996). In a study of 1,129 people with a test-retest of 51 subjects, researchers found a test-retest reliability of .92 and a mean score of 3.29 out of a possible score of 5 and a standard deviation of .91.

Charlson Comorbidity Index. The CCI was developed in 1987 (Charlson, Pompei, Ales, & MacKenzie, 1987) and was originally designed to assess the 1-year mortality from comorbid diseases in a group of hospitalized patients (N = 559) and later validated in a group of 685 hospitalized cancer patients. There are a total of 18 items on the scale, based on the International Classification of Diseases (9th and 10th editions, Coordination and Maintenance) (ICD-9-CM and ICD-10-CM). Weights are assigned to each comorbid disease for a total score; the higher the score, the greater the disease burden. In terms of validity, age and comorbidities were significant predictors of death ($p < .0001$); with the index showing reliability when compared to the Kaplan-Feinstein index. The researcher chose to use the CCI because it showed a higher global comorbidity among fallers (Ferrer et al., 2012). The part of the medical record used was the list of participants' diagnoses. The medical record assessment was used in the same way that the CCI would have been used in an actual interview. Chart review for the CCI allowed the measure to be based on medical record rather than self-report.

Procedures

The researcher introduced herself to the medical and nursing staff and requested that the medical personnel ask for their patients' permission to be approached after their healthcare visit by the researcher and assistant(s) about participation in this study. Potential participants were asked by their healthcare provider if they would like to find out about the study. If the patient agreed to participate, then the patient was approached in the waiting room after the visit and brought to a private area to be interviewed. The researcher told each participant about the study, answered any questions, obtained informed consent, and then conducted the assessments. Those meeting inclusion criteria and agreeing to participate were met after the participants' appointments and interviewed in a private area where they answered oral questions and completed study instruments. Participants were informed of the following: there was minimal risk in participation; any information obtained would not identify them; participation was entirely voluntary; and participants were compensated $20 for their participation, which was provided from two grants from Teachers College, Columbia University. There was no penalty for nonparticipation. Participants were made aware that they were being asked for informed consent for access to their medical records and they would be asked to sign an informed consent form approved by the Institutional Review Boards of Mount Sinai and Teachers College. If participants decided to participate, they were free to withdraw participation at any time, as doing so would not in any way affect the continued care they received. All information obtained was in hard copy form and was stored and analyzed on an encrypted, password-protected flash drive provided by Mount Sinai in a de-identified form per Mount Sinai and Teachers College, Columbia University protocols. Any information in hard copy form is stored in a locked file cabinet, as specified in the Mount Sinai IRB requirements. Participants were made aware that participation in this study entailed: time to answer questions from the questionnaires, time for the trained observer to evaluate their gait, and a chart review for conditions identified on the CCI.

Data Analysis

The statistics used are described in Table 3.2. The de-identified data were entered into an SPSS file, which was used to generate descriptive statistics including the mean, standard deviation, and range of every item. Internal consistency reliability (Cronbach's alpha) was computed for each of the summated scales except for the demographic assessment, the CCI, and the SRH. Linear and multiple linear regression analyses were done examining falls risk score as outcome variable. Cross-tabulations were done to examine gender comparisons. Bivariate linear regression analysis was done for each predictor, with the falls risk score as the dependent variable. Then, the best set of predictors was identified using backward stepwise linear regression analyses.

Results

A total of 120 elderly participated in this study. The only data that were missing were financial information from three participants who were unable to provide information because family members took care of their finances for them. The data on housing were coded to reflect two categories: any renter vs. owners with or without a mortgage. In general, participants in this sample were female (a total of 99 or 82.5%), widowed (a total of 46 or 38.3%), age 65-89 years, renters of apartments (a total of 98 or

Table 3.2

Data Analyses and the Dependent Variable (DV), Independent Variables (IV), and Control Variables (CV) by Specific Aim

Specific Aims	Predictors/Variables
1. To examine the relationship of the number of comorbid illnesses as documented through a chart review to the falls risk score as measured by the Elderly Falls Screening Test (EFST).	DV: fall risk score IV: comorbid illnesses listed in the CCI CVs: age, gender, education, income, housing, marital status Statistics: Descriptive statistics, cross-tabulations, bivariate linear regression, backward stepwise linear regression
2. To examine the relationship of falls efficacy as measured by the Modified Falls Efficacy Scale (MFES) to the falls risk score as measured by EFST.	DV: fall risk score IV: falls efficacy as measured by MFES CVs: age, gender, education, income, housing, marital status Statistics: bivariate linear regression, backward stepwise linear regression
3. To examine the relationship of self-rated health (SRH) as measured by the single-item index (Stanford University) to the falls risk score as measured by the EFST.	DV: fall risk scores IV: self-rated health CVs: age, gender, education, income, housing, marital status. Statistics: bivariate linear regression, backward stepwise linear regression
4. To examine the relationship of physical activity as measured by RAPA1 and RAPA2 to the falls risk score as measured by EFST.	DV: fall risk scores IV: RAPA1 and RAPA2 aerobic and anaerobic activity assessments. CVs: age, gender, education, income, housing, marital status Statistics: bivariate linear regression, backward stepwise linear regression
5. To determine the best predictors of fall risk scores	DV: fall risk scores CV: demographics Statistics: bivariate linear regression, backward stepwise linear regression

81.7%), and living on less than $10,000 to $19,999 (a total of 41 or 34.2%). More than a quarter were high school graduates or had a GED equivalent (a total of 33 or 27.5%). Using EFST to assess the dependent variable, the falls risk score, 95 or 79.2% of the participants experienced 0-1 falls in the previous year. A total of 25 or 20.8% of the participants experienced 2 or more falls in the previous year. Statistical analyses addressing the specific aims are contained in Table 3.2. Table 3.3 contains demographic data on marital status, housing, and income. Table 3.4 shows the mean, median, mode, and standard deviation of scores on the instruments used. The last column of this table shows the mean, median, mode, standard deviation, and minimum/maximum/range for participants' age.

Relationship Between Fall Risk Score (FRS) and Comorbidity

Table 3.5 shows the results of the regression analysis with FRS as the outcome, CCI as the predictor, and demographics as covariates (i.e. age, gender, education, income, housing,). Controlling for demographics, comorbidity was a significant predictor of FRS ($t = 2.137$, $p = .035$). The higher the comorbidity indexes the higher the falls risk. None of the covariates was statistically significant.

Relationship Between Fall Risk Score (FRS) and
Falls Efficacy as Measured by MFES

Table 3.6 shows results of a regression using FRS as the outcome, MFES as the predictor, and demographics as covariates. Controlling for demographics, fall efficacy was a significant predictor of FRS ($t = -6.506$, $p < .001$). As fall efficacy increases (that is, as the confidence in doing various activities without falling increases), FRS decreases. None of the covariates were statistically significant.

Table 3.3

Demographic Data

Variable	Frequency	Percent
Gender		
Male	21	17.5
Female	99	82.5
Total	120	100.0
Falls		
0-1 fall	95	79.2
2 or more falls	25	20.8
Total	120	100.0
Assistive Device Usage		
Yes	60	50.0
No	60	50.0
Total	120	100.0
Housing		
Any renter	101	84.2
Owned with or without a mortgage	19	15.8
Total	120	100.0
Gait		
Even, straight with feet raised each step	43	35.8
Uneven, shuffling, wide base or unsteady	77	64.2
Total	120	100.0
Education		
No schooling-12th grade	39	32.5
High school graduate-Associate’s Degree	54	45.0
Bachelor’s Degree and higher	27	22.5
Marital Status		
Now married	17	14.2
Widowed	46	38.3
Divorced	24	20.0
Separated	10	8.3
Never married	23	19.2
Total	120	100.0
Income		
Less than $10,000-$29,999	95	79.2
$30,000-$89,999	19	15.9
$100,000-$149,999	3	2.5
$100,000-$149,999	3	2.5
Missing/no answer	3	2.5
Total	117	100.0

Table 3.4

Mean, Median, Mode, Standard Deviation, Minimum and Maximum of Findings for Sample and Possible Range for Instruments

N = 120	FRS	CCI	MFES	RAPA1	RAPA2	SRH	AGE
Mean	2.01	5.93	8.10	3.44	.76	2.65	75.72
Median	2	5.5	9	3	0	3	75.50
Mode	2	5	9	3	0	3	76
Standard Deviation	1.520	2.231	1.876	1.516	1.092	.885	6.671
Range	5	9	8	5	3	4	24
Minimum	0	2	2	2	0	1	65
Maximum	5	11	10	7	3	5	89
Instrument Range	0-5	0-greater than 5	0-10	1-7	0-3	1-5	N/A

Table 3.5

Multiple Regression Analyses of Charlson Morbidity Index (CCI) and Covariates Predicting Elderly Falls Screening Test Scores—or Fall Risk Scores

	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
Constant	-.240	1.804		-.133	.894
Age	.014	.023	.061	.592	.555
Gender	.150	.370	.039	.406	.685
Education	.050	.061	.092	.830	.408
Income	-.128	.084	-.185	-1.528	.129
Housing	.255	.452	.062	.563	.574
CCI	.148	.069	.221	2.137	.035

Table 3.6

Multiple Regression Analysis of Modified Falls Efficacy Scale and Covariates Predicting Fall Risk Scores

	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
Constant	3.979	1.706		2.332	.022
Age	.013	.018	.058	.713	.477
Gender	.061	.321	.016	.189	.850
Education	.041	.053	.074	.771	.442
Housing	.345	.383	.083	.899	.371
Income	-.048	.073	-.069	-.653	.515
MFES	-.423	.065	-.529	-6.506	<.001

Relationship Between Self-rated Health and Fall Risk Score (EFST)

Table 3.7 shows the results of a regression using FRS as the outcome, SRH as the predictor, and demographics as covariates. Controlling for demographics, self-rated health was a significant predictor of FRS (*t* = -3.303, *p* = .001). As self-rated health improves, FRS decreases. None of the covariates were statistically significant.

Table 3.7

Multiple Regression Analysis of SRH and Covariates Predicting Fall Risk Scores

	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
Constant	-.174	1.716		-.101	.919
Age	.037	.020	.161	1.807	.073
Gender	.128	.360	.033	.354	.724
Education	.065	.059	.117	1.095	.273
Housing	.552	.430	.133	1.282	.202
Income	-.060	.083	-.087	-.726	.469
SRH	-.502	.152	-.299	-3.303	.001

Relationship Between FRS and RAPA1

Table 3.8 shows the results of a regression using FRS as the outcome, RAPA1 (aerobic activity) as the predictors, and demographics as covariates. Controlling for demographics, RAPA1 was a significant predictor of FRS (t = -4.583, p < .001). FRS increases as aerobic physical activity decreases.

Table 3.8

Multiple Regression Analysis of RAPA1 and Covariates Predicting Fall Risk Scores

	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
Constant	1.315	1.715		.767	.445
Age	.019	.020	.084	.955	.342
Gender	.195	.345	.050	.563	.574
Education	.084	.057	.152	1.473	.144
Housing	.375	.413	.091	.908	.366
Income	-.105	.078	-.152	-1.347	.181
RAPA1	-.393	.086	-.398	-4.583	<.001

Relationship Between FRS and RAPA2

Table 3.9 shows the results of a regression using FRS as the outcome, RAPA2 (anaerobic activity) as the predictor and demographics as covariates. Controlling for demographics, RAPA2 was a significant predictor of FRS (*t* = -2.373, *p* = .019). FRS increases and anaerobic physical activity decreases.

Table 3.9

Multiple Regression Analysis of RAPA2 and Covariates Predicting Fall Risk Scores

H	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
Constant	-1.065	1.720		-.619	.537
Age	.035	.021	.153	1.674	.097
Gender	.064	.372	.016	.172	.864
Education	.066	.060	.119	1.091	.277
Housing	.524	.440	.127	1.192	.236
Income	-.085	.084	-.122	-1.006	.316
RAPA2	-.299	.126	-.219	-2.373	.019

Table 3.10 shows the results of bivariate analyses with FRS as the dependent variable and each individual predictor (CCI, MFES, SRH, RAPA1, and RAPA2). According to the bivariate analysis of predictors, 31% of the variance in FRS is accounted for by MFES (R square was .310).

Table 3.10

Results of Individual Bivariate Linear Regression Analyses of Each Predictor of FRS

	Unstandardized Coefficient B	Unstandardized Coefficient Std. Error	Standardized Coefficient Beta	t	Sig.	R^2
CCI	.179	.061	.263	2.959	.004	.069
MFES	-.452	.062	-.557	-7.290	<.001	.310
SRH	-.543	.150	-.316	-3.621	<.001	.100
RAPA1	-.437	.083	-.435	-5.255	<.001	.190
RAPA2	-.350	.124	-.252	-2.826	.006	.063

N = 120, $p < .05$

Table 3.11 shows the initial linear model with FRS as the dependent variable, all predictors and all demographics included in the regression. MFES is the only significant predictor of fall risk score ($p < .001$).

Table 3.11

Backward Stepwise Linear Regression Analysis of Predictors of FRS (the Initial Model)

Model	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
Constant	4.602	1.721		2.674	.009
CCI	.040	.063	.060	.639	.524
MFES	-.330	.073	-.413	-4.522	<.001
SRH	-.120	.148	-.071	-.808	.421
RAPA1	-.161	.096	-.163	-1.688	.094
RAPA2	-.085	.119	-.062	-.712	.478
AGE	.004	.020	.018	.201	.841
GENDER	.019	.320	.005	.060	.953
EDUCATION	.049	.052	.089	.937	.351
HOUSING	.315	.391	.076	.807	.422
INCOME	-.040	.074	-.058	-.540	.590

N = 120

R-squared is .372 for the initial model.

Table 3.12 shows the final or trimmed model of backward stepwise linear regression analysis of predictors of FRS. Using a backward stepwise linear regression analysis in SPSS, the final model resulted in MFES and RAPA1 being significant predictors of FRS (MFES t = -5.475, p < .001; RAPA1 t = -2.838, p = .005). The R-squared of the final model was .355, which means that 35.5% of the variance in FRS can be attributed to these two predictors: MFES and RAPA1.

Table 3.12

Backward Stepwise Linear Regression Analysis of Predictors of FRS (the Final Model)

Model	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
Constant	5.794	.502		11.538	<.001
MFES	-.367	.067	-.453	-5.475	<.001
RAPA1	-.236	.083	-2.35	-2.838	.005

N = 120, $p < .05$, R-squared was .355

Discussion

This study investigated how fall risk scores were related to chronic illness, falls efficacy, self-rated health, aerobic and anaerobic physical activity in community dwelling, and elderly Blacks attending two outpatient clinics in Mount Sinai Hospital. In the bivariate analysis, it appeared that the predictor accounting for the greatest amount of variance in the FRS was MFES, with MFES accounting for 31% of the variance in FRS. The trimmed model showed that aerobic physical activity, demonstrated by scores on RAPA1, and falls efficacy, demonstrated by scores on MFES, were the best predictors of FRS. As aerobic activity and efficacy for doing activities of daily living without falling decreased, FRS increased. Ninety-five (79.2%) of the participants in this study had 0-1 falls in the past year and 25 (20.8%) fell 2 or more times in the past year.

This study was the first to show that physical inactivity is related to fall risk score in elderly Blacks using the Elderly Falls Screening Test and RAPA. The original research study using RAPA (Topolski, LoGerfo, Patrick, Williams, & Walwick, 2006) included a sample that was 73% White, 18% African American/Black, and 9% other. More than half of the sample in the original research for RAPA (55%) was physically active. Although it is possible that people who are more active are more likely to fall because they have greater opportunities to fall, physical activity has been shown to be protective (CDC, 2012) and was shown to be protective in this study. It could be explained that greater physical activity makes people physically stronger.

Factors that play a role in elderly African Americans' perception of risks and their ability to meet their daily needs were examined. It could be explained in the context of this study that elderly could be slow and unsteady, but as long as they did not have more than 1 fall in the past year, they could score lower on the EFST. The deciding factor giving them higher scores and, thus, a higher risk was increased frequency of falls (2 or more in the past year). Chronic illness was a significant predictor of fall risk score in the bivariate analysis ($p = .004$) and in the multiple regression analyses (p = .035), but was dropped from the final model. These findings can be compared to the findings of Faulkner et al. (2005), who found that chronic illness was 19% higher among African American women. Faulkner et al. noted, however, that African American and White women younger than age 75 had similar fall rates (RR = 1.17, 95%, CI = 0.78-1.75, $p = .46$). After the age of 75, the fall rate for White women increased (RR = 1.50, 95%, CI = 0.90-2.49, $p = .12$). Again, the findings did not reach statistical significance. In women over the age of 75, chronic illness was not a significant predictor of fall risk ($p = .10$). In women under age 75, fall rates were similar between African Americans and Whites, with no change after adjusting for chronic illnesses, depression or grip strength ($p = .37$). The Faulkner study was hampered by the very small sample size of African

American women compared to White women. Means et al. (2000) found that the fall history of Whites was similar to that of African Americans (32.8% vs. 32.2%), with little difference in fall-related injuries (20.1% vs. 15.4%), $p = .33$. Both of these rates were higher than the rate of falling recorded in the present study. This researcher was unable to find studies that assessed a risk score using the EFST or yielding an exact number of falls comparing African Americans to Whites. The use of a risk score assessment was based not just on verbal recollection of falls in the past year, but also on observations of gait and of a timed walk.

Consistent with the literature, osteoarthritis and use of a walking aid were common (Ling & Bathon, 1998). In this study, 60 (50%) of the sample used an assistive device to ambulate and 81 (67.5%) suffered from a rheumatoid disease, including osteoarthritis. Contrary to the literature, gender did not play a role in falls in this study, but there may not have been enough male subjects in the study to show an effect for gender.

Strengths

The researcher used instruments that have been well researched and used in the general population. In this study, these instruments were used exclusively in a population that was all Black. The researcher was able to do a physical assessment, the timed 5-meter walk, similar to other studies with African American participants of similar sample size (Arnold & Faulkner, 2007; Means et al., 2005). The participants in this study received an incentive for participating. The researcher was able to provide compensation to participants from two grants received from Teachers College, Columbia University.

Limitations

It is unknown how many patients were excluded from participation by the physicians and nurse practitioners. It is also unknown how many people who were eligible declined to participate. The researcher did not tally those numbers. The data on number of falls were collected exactly as described by the instrument. Falls were classified as 0-1 falls in the past year and 2 or more falls in the past year instead of exact number of falls in the past year. The researcher encountered barriers to participation in this research. Some participants were really not well and it was evident in their appearance as well as in their explanation of their reasons for being in the clinic. Some had appointments with multiple providers on the same day and in some cases in different clinics. Others had difficulties in getting home, making it a priority to get finished with their healthcare provider for their ride home on Access-A-Ride. A missed ride meant rescheduling and a late return home. The presence of family members who provided rides made the elderly unable to participate because family members worried about getting parking tickets and hurried their loved ones along. The researcher encountered mistrust on the part of some potential participants, as described in previous research studies (Corby-Smith, Thomas, Williams, & Moody-Ayers, 1999). In order to make potential participants feel more comfortable, the researcher wore her Mount Sinai uniform and identification and made every effort to be introduced by the primary healthcare provider so that potential participants could feel more comfortable that the researcher was a part of the team of professionals working together to use the research findings to help them. Despite this, some continued to be doubtful and thus did not participate.

This was a correlational study that showed associations or relationships between variables and was not an experimental study. Therefore, it cannot be implied that a change in one variable caused a change in another variable. The findings of this study may be unique to the population being studied. For example, if this study were done in a population with lower or higher income, elderly Blacks or in a suburban or rural rather than urban setting, the findings might be different. Another limitation of this study was the use of cross-sectional, self-reported data. Cross-sectional data provided a snapshot of a situation at one moment in time. Feelings or attitudes and experiences may change over time and this cannot be recorded with cross-sectional data.

Individuals may reply in a manner that is socially desired or pleasing to the researcher, a situation known as social desirability bias. Participants may withhold information intentionally or forget to include information. The elderly are particularly sensitive about reporting that they are falling or experiencing near-falls. It is embarrassing to them and may indicate the need for assistance. Family and professionals may see this as an opportunity to intervene with assistance that is undesired by the elder. In this study, the researcher attempted to verify self-reported information with the chart review to cross-check information from another source to validate patient reports of falls, near-falls, and fall-related injuries as reported in the patients' electronic medical record (EMR). The researcher found self-report of falls to be consistent with what was found in the EMR. The researcher also found self-report of injury to be accurate with what was found in the EMR. Self-report of falls in the elderly historically has not been as accurate as following them over the next year and calling them every 3 months to see if they have had a fall, and to see if the information collected initially predicts falls in the next year.

This study was limited by the very fact that those who have fallen more than once in the past year may not have been able to get to the clinic. Those most likely to fall are the cognitively impaired, a population that was unable to participate in this research, as they are unable to give informed consent (Fuller, 2000; Shaw, 2002; Welmerink, Longstreth, Lyles, & Fitzpatrick, 2010). Some elderly really wanted to participate but for them, this was not a well visit; it was a sick visit and they were not feeling well. Some were really unable to participate due to the constraints of multiple practitioner appointments on the same day, thus restricting their availability. During the timed 5-meter walk, the participants were aware they were being observed. Some may have demonstrated their best walk. Those who fell more than once may have been excluded from the study because they were not ambulatory, and others were institutionalized or unable to come to the clinic. A final limitation of this study deals with the use of closed-ended questionnaires and assessment instruments that do not allow participants to explain reasons for their answers.

Significance of the Study

The findings of this study add to the small body of research that is available on Blacks and on falls and they examine other predictors that may influence falls in this population in particular.

Implications for Practice

New knowledge on falls, falls risks, and especially near-falls may be used to re-educate healthcare practitioners on this topic and improve standards of healthcare among Blacks as well as all minority populations. Encouraging patients to participate in any activities to increase their aerobic capacity, such as dance classes, may improve their physical and emotional capacity to prevent falls. Patients may feel more secure and have greater endurance, and both have been shown in this study to be related to FRS. Clinical practitioners should follow the guidelines established by the American Geriatrics Society for the screening of all elderly for falls and balance abnormalities. The U.S. Preventive Services task force recommends that all women age 65 and older as well as younger women who have risk factors for fractures exceeding those of a White woman age 65 get screened for osteoporosis.

Once they are assessed by their primary healthcare provider, elderly can be prescribed individualized physical therapy exercises. According to Gordon et al. (2004), the greatest predictor of involvement in an exercise-based risk reduction program for stroke survivors was physician recommendations. Exercise should be encouraged by healthcare providers for all age groups. Exercise is beneficial physically as well as socially and can reduce result in increased strength, tolerance, motor control, and balance in older age groups.

Implications for Further Research

If a fall can be prevented by the simplest interventions, such as proper footwear, assistive devices, environmental modification, and more aggressive physical assessment, then direct and indirect costs to the individual and society can be lowered dramatically. However, interventions can only be implemented if the assessment is made. If the elderly are not asked, they will not volunteer this information. If falls are frequent, the elder may not see them as a problem since it happens so frequently and especially if no injury results.

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Chapter IV

NEAR-FALLS IN THE ELDERLY: A STUDY OF ELDERLY, COMMUNITY-DWELLING BLACKS FROM TWO OUTPATIENT CLINICS IN HARLEM

The World Health Organization (WHO) (2010) defined a fall as “inadvertently coming to rest on the ground, floor, or other level, excluding intentional changes in position to rest on furniture, the wall or other objects” (p. 6). Near-falls, stumbles, and missteps have been described as slips (sliding of the supporting leg), trips (the swinging leg impacts an object) or losses of balance in which a person is able to prevent himself/herself from hitting the floor or ground (Arnold & Faulkner, 2007).

Physiological Systems and Maintenance of Balance and Upright Stance

According to Horak (2006), there are two main goals of postural control: postural orientation and postural equilibrium. Postural orientation is alignment and control of body tone in relationship to gravity, support surface, visual environment, and internal references for spatial orientation. Postural equilibrium is coordination and interpretation from visual, somatosensory, and vestibular systems. Visual cues provide information on position and motion of the head using the surrounding environment as a reference point to assist in the maintenance of a vertical position. The performance of activities from the simple to complex such as activities of daily living (ADLs) requires interaction of systems to maintain postural control (Virk & McConville, 2006). Proprioceptive cues allow for the perception of the relationship of body segments to each other. Somatosensory cues provide tactile stimulation on the neural level. Vestibular systems, present in the inner ear, are responsible for the monitoring of motion and position of the head in space (Virk & McConville, 2006). These systems work together to maintain upright stance and balance.

Elderly individuals and those with impairments of balance have a tendency to rely on vision to maintain balance as they orient themselves in surroundings that are familiar to them. When disturbances to balance in environments unfamiliar to them occur, these disturbances require rapid adaptation to maintain balance and upright stance. Elderly individuals with cognitive, sensory, and physical impairments tend to rely on their ability to see to grab onto an object, tend to take many more steps, and move their heads less than younger persons without balance impairments. Balance recovery is made more difficult when other impairments such as deteriorating musculoskeletal, sensory, and vestibular systems are factored into the equation (Virk & McConville, 2006).

Near-falls, Stumbles, and Missteps

Relationship to Falls

Near-falls, stumbles, and missteps may be more common than falls but not as extensively studied in the elderly (Arnold & Faulkner, 2007). According to Hafner and Smith (2009), during a near-fall, the pattern and flow of walking pace are interrupted and individuals need the use of precautionary and protective measures to maintain themselves upright or to lower themselves carefully to the floor or ground. Near-falls, stumbles or missteps have been shown in a number of studies to occur more frequently than falls and may be precursors to falls. Syrgley, Herman, Giladi, and Hausdorff (2009) suggested that an evaluation or assessment of near-falls or missteps may be a sensitive method of identifying those at risk of falling, especially those who have not yet experienced an actual fall. Missteps may be related to falls, with individual elders' postural recovery and cognitive functioning being factors determining whether the elder experiences a misstep versus a fall when balance is challenged. Syrgley et al. found that missteps were correlated to prospective falls ($r = .38$, $p < .001$). Participants with multiple missteps were shown in a prospective study to be more likely to have a fall (RR = 3.89). The findings of the Syrgley et al. study indicated that 20.7% of participants had a minimum of one misstep. Those with multiple falls had three times more missteps present. Missteps were also associated with depression ($p = .009$) and anxiety ($p = .014$).

Purpose

The purpose of this paper is to examine the relationship of near-falls to demographic variables, use of assistive devices, gait (even, straight, and feet and raised with each step vs. uneven, shuffling on a wide base, or unsteady) and physical activity levels.

Classification Systems

Under the current classification system, a faller generally is a person who has fallen at least 2 or more times over the past 6 months to a year. Recurrent fallers are those who have experienced 3 or more falls within the past 6 months to a year (Masud & Morris, 2001). Using current classification approaches of faller versus non-faller for the elderly, clinicians may be missing subtle changes in balance, thus preventing identification of those at risk. It may be argued that experiencing a near-fall event may indicate a) the retention of the ability to correct postural imbalance, b) the decline of physical ability and a risk factor for future falls, and c) a decline in perceptual and cognitive abilities for assessing the situational risk for falling relative to physical ability (Yogev-Seligman et al., 2012). Arnold and Faulkner (2007) suggested that near-falls may be more difficult to recall as a specific event, especially if they are frequent for the elder. Keeping this in mind, Arnold and Faulkner classified near-falls as either occurring frequently (once weekly or more) or occasionally (less than once/weekly but more than a couple of times in the past year). Researchers Srygley et al. (2009) found that missteps were more frequently studied among the elderly with balance disorders such as Parkinson’s disease or myotonic dystrophy type 1, less frequently studied among the healthy elderly, and not as extensively studied as falls in the research literature (Ryan, Dinkel, & Petrucci, 1993).

Occurrence and Frequency

Near-falls may be more common in the elderly population than falls. For example, in a 3-week feasibility study with data provided by 21 elderly, Ryan et al. (1993) compared the results of independent community-dwelling residents (N = 10) to retirement home inhabitants (N = 11) and found a near-fall incidence of 19 for a rate of 4.7%, with 7 (35%) of the participants responsible for 19 near falls, with 4 of the 7 near-fallers residing in retirement homes, and 3 of the near-fallers residing independently. One of the near-fallers used an assistive device. Near-fallers were more likely to live at their current residence less time (5-10 years vs. 10-20 years for non-near fallers) and were more likely to be a year younger than non-near fallers (78.7 years vs. 79.9 years). Near-fallers reported their last fall within the past 6 months and the last near-fall within the past month. Non-near-fallers reported their last fall within the past year. Seventy-seven percent of the non-near fallers did not remember when they experienced a near-fall. Those elderly without a history of falls in the past year had a higher number of missteps than falls during the subsequent 12 months. These findings should be investigated further because near-fallers may be at high risk of falls and injuries, but not targeted for intervention because missteps may be underreported or not recorded by healthcare providers. Higher scores on the Geriatric Depression Scale and the State-Trait Anxiety Inventory were correlated with missteps. Those at high risk in the hospital for near-falls were more vulnerable for future falls upon discharge into the community (Ashburn, Hyndman, Pickering, Yardley, & Harris, 2008). In a 2008 study of 122 hospitalized stroke patients, with 115 providing data, a history of near-falling while hospitalized achieved the highest significance of 7 potential predictors of repeat falls. These findings suggest a need for nursing staff to initiate community services to prevent potential future injuries to elderly sent home in the community setting.

The Timed Up and Go test (TUG) indicates the time taken to stand up from a chair, walk three meters, turn, return to the chair, and sit. The TUG is a simple screening tool used to identify those who are at risk for falls and near-falls (Arnold & Faulkner, 2007). A measure of balance and mobility, the TUG is often used in conjunction with other assessments in the elderly to predict future falls. Of 106 community-dwelling elderly with osteoarthritis studied by Arnold and Faulkner, 45% experienced a fall in the past year. Forty-eight participants experienced 59 falls, with 40% under the age of 75 falling in the past year and 52% over the age of 75 falling. Trips, slips, and losses of balance were the cause of falls as the elderly attempted ambulation, ascent and descent of stairs, and reaching and getting to a chair. Approximately 80% of this sample experienced frequent or occasional near-falls. Those with TUG scores greater than 10 seconds or who were over the age of 75 were three times more likely to be frequent near-fallers vs. occasional near-fallers or those who never had a near-fall. The findings from this study by Arnold and Faulkner may indicate that the TUG is a useful instrument to help healthcare providers to identify those patients who have frequent near-falls but who have not yet fallen. Of note, the TUG test is not used for this study.

One of the elements on the EFST is a timed, observed, 5-meter walk, which is, like TUG, easily administered by trained individuals. Also like TUG, it is a test of balance and mobility and, according to Arnold and Faulkner, is a good predictor of near-falls. The TUG, like EFST, is a timed test. For the TUG test, an individual is required to rise from a seated position, walk a distance of three meters, turn around, and return to the chair and sit. In the Arnold and Faulkner study, participants were three times more likely to be near-fallers if their TUG score was >10 seconds (OR = 3.1, 95%, CI: 1.0-9.9) or if they were older than 75 years of age (OR = 3.0, 95%, CI: 1.3-7.3).

Involuntary, Physiological Compensatory Responses

Compensatory responses describe the ability to respond quickly and efficiently to unexpected disruptions in balance to regain stability and are determining factors in the occurrence of falls. Impairments in the ability to modify change-in-support reactions, such as rapid stepping or reaching and grasping, have been positively associated with advanced age and increased fall risks (Mansfield et al., 2010). Slips and trips trigger such postural responses that are not under voluntary control. Most studies feature falls as the dependent variable; few study near-falls. After a comprehensive search, this author was unable to find research articles with near-falls as a dependent variable in elderly community-dwelling Blacks. This is important because they are vulnerable and may not be assessed for near-falls as either inpatients or outpatients. Elderly Blacks also have increased disability, decreased survival rates due to an increased number of comorbid diseases (Bohannon, 1999; National Institute of Arthritis and Musculoskeletal and Skin Diseases, 2010), as well as underdiagnosis and undertreatment of osteoporosis (Wilkins & Goldfeder, 2004), lower physical activity levels (Brownson et al., 2000), slower functional obstacle course (FOC) completion times, greater neurological abnormalities (Means et al., 2005), and increased frailty (Hirsch et al, 2006). These are all risk factors putting Blacks at increased risk of falling compared to their White counterparts, but Blacks have fewer documented fall episodes, a paradox not explained by the literature. However, much of the research has been done on White females, with other racial groups and males poorly represented (World Health Organization, 2010). Near-falls may be important precursors to actual falls. The purpose of this study is to examine the correlates of near-falls.

Method

This study used a cross-sectional, retrospective, correlational design.

Participants

One hundred and twenty community-dwelling, elderly Black patients age 65 and older attending two clinics of the Mount Sinai Hospital in Harlem in New York City were recruited to participate in the study. The two clinics were the Martha Stewart Center for

Living, which is a full service clinic offering outpatient care exclusively to the elderly, and Internal Medicine Associates (IMA), which is a full-service clinic offering comprehensive outpatient services across the age spectrum.

Primary Instruments

The primary instrument used was the Elderly Falls Screening Test (EFST) described by Cwikel, Fried, Biderman, and Galinsky (1998). In summary, the EFST is a 5-item instrument that allows participants to self-report falls, injury, and near-falls incidents in the past year. Two items require the direct observation of a trained observer of the elder walking a distance of 5 meters or 16.4 feet for time and gait pattern. Scores can range from 0 to 5; the higher the score, the greater the risk of falling. Test-retest reliability over 1 year was 0.40, positive predictive value was 66.7%, sensitivity was 83%, and specificity was 69%. For this study, Cronbach's alpha was .682. In addition, the researcher chose to look at near-falls as the dependent variable instead of the entire score since frequency of near-falls could be the deciding factor in classifying an elder as being at a high or low risk.

The second instrument was the demographic assessment instrument, which assessed age, gender, education, income, housing, and marital status. For the purposes of this inquiry, age and gender were being used from this instrument. The third instrument was the Rapid Assessment of Physical Activity (RAPA), a 9-instrument assessment of physical activity level measuring aerobic activity (questions 1-7) and anaerobic activity (questions 8-9) (Topolski, LoGerfo, Patrick, Williams, & Walwick, 2006). Other instruments were used in this study; however, the focus here was on those named.

Procedure

Potential participants were recruited from the clinics based on referral from the primary physicians, who were approached by the researcher and asked for their permission to approach their patients. Patients were asked by their healthcare provider if they wished to find out about the study. If they agreed, the patient was approached after their healthcare visit. After informed consent was obtained, the researcher administered the questionnaire and, while using a stopwatch, observed patients walking a distance of 5 meters.

Data Analysis

De-identified data were entered into SPSS. Statistical analyses included descriptive statistics, individual bivariate analyses with near-falls as the dependent variable and five separate predictors as independent variables, and backward stepwise logistic regression with near-falls as the dependent variable and the six predictors as well as demographic covariates. The interpretation of the findings was based on *p*-value or type I error rate of 0.05 and a 95% confidence interval (CI). Descriptive statistics and frequencies were assessed.

Results

As Table 4.1 shows, 99 participants were female (82.5%) and 21 were male (17.5%). Fifty-seven participants (47.5%) never or rarely experienced near-falls in the past year; 63 participants (52.5%) occasionally or frequently experienced near-falls in the past year. Exactly half of the sample used an assistive device. The participants in the sample were primarily renters, had an income of less than $20,000, and were high school graduates (N = 33 OR 27.5%). Most (n = 77 or 64.2%) walked with an unsteady gait.

Table 4.2 shows the youngest participant was 65 and the eldest 89, with a mean age of 75.72 years. Aerobic activity or RAPA1 scores for participants in this study ranged from 2 to 7, with a mean of 3.44. Anaerobic activity, or RAPA2 scores ranged from 0 to 3, a mean of .76. The time to complete the 5-meter or 16.4-foot observed walk averaged 9.19 seconds and ranged from the fastest of 5.10 to the slowest of 14.2 seconds.

Table 4.1

Frequencies for Major Demographic Variables

Variable	Frequency	Percent
Gender		
Male	21	17.5
Female	99	82.5
Total	120	100/0
Near-falls		
Never or rarely	57	47.5
Occasionally or frequently	63	52.5
Total	120	100.0
Assistive Device Usage		
Yes	60	50.0
No	60	50.0
Total	120	100.0
Housing		
Any renter	101	84.2
Owned with or without a mortgage	19	15.8
Total	120	100.0
Gait		
Even, straight with feet raised each step	43	35.8
Uneven, shuffling, wide base or unsteady	77	64.2
Total	120	100.0

Table 4.1 (continued)

Variable	Frequency	Percent
Education		
No schooling	2	1.7
Nursery-8th grade	11	9.2
9th, 10th, 11th grade	19	15.8
12th grade, no diploma	7	5.8
High school graduate/GED	33	27.5
Some college but less than 1 year	2	1.7
1+ year	12	10.0
Associate's Degree	7	5.8
Bachelor's Degree	10	8.3
Master's Degree	13	10.8
Professional Degree	3	2.5
Doctorate	1	.8
Total	120	100.0
Marital Status		
Now married	17	14.2
Widowed	46	38.3
Divorced	24	20.0
Separated	10	8.3
Never married	23	19.2
Total	120	100.0
Income		
Less than $10,000-$29,999	95	79.2
$30,000-$89,999	19	15.9
$100,000-$149,999	3	2.5
$100,000-$149,999	3	2.5
Missing/no answer	3	2.5
Total	117	100.0

Table 4.2

Descriptive Statistics for Continuous Variables

	Minimum	Maximum	Mean	Standard Deviation
Age	65	89	75.72	6.671
RAPA1-Aerobic	2	7	3.44	1.516
RAPA2-Strength & Flexibility	0	3	.76	1.092
Time	5.10	14.20	9.1940	2.14351

N = 120

Table 4.3 shows the results of individual bivariate analyses of predictors of near-falls. Assistive device, time in seconds on the 5-meter or 16.4-foot observed walk, the participants' gait during that walk, age, and answers to questions on the RAPA (an instrument measuring aerobic and nonaerobic activity) were entered into a logistic regression analysis individually to arrive at these values. According to the analyses, those who used an assistive device were more likely to experience a near-fall. Participants' walk time was significantly related to near-fall experiences. Having an unsteady gait was a significant predictor of near-falls. There was a significant negative relationship between scores on RAPA1 and near-falls. Participants who did not do aerobic exercises were more likely to experience a near-fall.

Table 4.3

Results of Individual Bivariate Analyses of Predictors of Near Falls

	B	Standard Error	Wald	Df	Significance	Odds Ratio	Nagelkerke
Assistive Device	.883	.375	5.556	1	.018	2.418	.062
Time (5-meter walk)	.303	.095	10.274	1	.001	1.354	.120
Gait	1.128	.397	8.069	1	.005	3.090	.091
Age	.001	.028	.003	1	.959	1.001	.001
RAPA1	-.285	.128	4.971	1	.026	.752	.057
RAPA2	-.250	.171	2.140	1	.143	.779	.024

Table 4.4 shows the results of a multiple logistic regression analysis with near-falls as the outcome or dependent variable and demographics, RAPA1, RAPA2, assistive device use, and time of the 5-meter observed walk as predictors. Housing is coded into two categories: those who were renters and those who owned with or without a mortgage. For income, only three participants did not have data on their finances because their financial affairs were attended to by relatives. Data were therefore provided on income on 117 participants. In this initial model, gender was the only significant predictor of a near-fall experience (p = .008); walk time approached significance (p = .053). Holding all other variables constant, males were more likely to have a near-fall and for each second increase in time, the odds of having a near-fall increased by 1.334. In this initial model, although not statistically significant, RAPA1 was inversely related to having a near-fall

experience. Participants who did not participate in aerobic activity were more likely to experience a near-fall.

Table 4.4

Multiple Logistic Regression Analysis: Dependent Variable Near-Falls (the Initial Model) (N = 117)

	B	SE	WALD	df	Sig.	Odds Ratio
CONSTANT	1.208	2.910	.172	1	.678	3.346
Age	-.047	.037	1.610	1	.204	.955
Gait	.401	.624	.413	1	.521	1.493
Gender	1.635	.620	6.952	1	.008	5.132
Education	.117	.093	1.608	1	.205	1.125
Income	-.218	.133	2.682	1	.102	.804
Housing	-.660	.691	.914	1	.339	.517
RAPA1	-.139	.171	.658	1	.417	.871
RAPA2	.041	.214	.036	1	.850	1.041
Assistive Device	.057	.592	.009	1	.923	1.059
Time (seconds on 5 meter observed walk)	.288	.151	3.661	1	.056	1.334

RAPA1 is the Rapid Assessment of Physical Activity (aerobic activity assessment).
RAPA2 is the Rapid Assessment of Physical Activity (anaerobic activity assessment).
Nagelkerke R-squared was .241.

Table 4.5 demonstrates the results of the final backward stepwise logistic regression analysis. The two variables that remained significant were gender and time in seconds on the 5-meter observed walk. When only timed walk was controlled for, males were more likely to experience a near fall than females. In controlling for gender, for each second increase in time, the odds of having a near-fall increased by 1.414.

Table 4.5

Backward Stepwise Logistic Regression: Results of the Trimmed Model (the Final Model) (N = 120)

	B	Standard Error	Wald	df	Sig.	OR	Nagelkerke (model)
Constant	-3.286	.971	11.450	1	.001	.037	.178
Gender	1.302	.567	5.275	1	.022	3.675	
Time (seconds) of 5-meter walk	.346	.101	11.684	1	.001	1.414	

N = 120

Discussion

Individual predictors that were associated with near-falls in this study were gender and time to complete the observed 5-meter walk. These predictors proved significant or approached significance in both the initial regression model and in the final regression model. In this study, men, despite their low representation in this study, were found to be at greater risk of experiencing a near-fall compared to women. Those who walked the 5-meter distance more slowly were at greater risk of experiencing a near-fall. The slowest elderly walked 14.2 seconds. This study found that near-falls were inversely associated with aerobic physical activity. As aerobic physical activity decreased, near-falls risk increased. This study found that that the least active participants who scored a minimum score of 2 on RAPA1, formally classified by RAPA1 as underactive, did some activity but not every week. The average elder did some light activity every week. The most active participants scored a 7 on RAPA1, formally making them active elders who participated in no less than 20 minutes of daily activity no less than 3 days weekly. The majority of elderly in this study did not do weight training/calisthenics or yoga, as assessed by RAPA2.

T-tests on the major variables in the study were carried out to investigate the gender effect. The *t*-tests showed there was no significant gender difference on any of the variables in the near-falls analysis. However, the relationship of gender to near-falls approached significance (p = .051, t = -2.032, mean for males = .71, and mean for females .48) as did the relationship of RAPA2 (t = 1.709, p = .095, mean for males .48, and mean for females = .82). Although the mean for assistive device was not significant, 53% of the women used an assistive device, while only 38% of the men used such a device. When other variables are controlled in the analysis, gender became significant probably because time was correlated with several variables including RAPA2 (-.209) and assistive device (.627). Controlling for the time it took participants to complete the 5-meter walk uncovered a strong relationship of gender to near-falls (OR = 3.68 p = .022).

Comparison of Findings to the Literature

The findings this study corresponded with the findings of Arnold and Faulkner (2007), Srygley et al. (2009), Brownson et al. (2000), and Means et al. (2000). Near-falls events occurred more frequently than actual fall events (Arnold & Faulkner, 2007). The participants in this study reported multiple near-falls occurring occasionally or frequently (52.5%) or somewhat less frequently than the sample studied by Arnold and Faulkner (80%). This study's participants identified trips and stumbles as causes of their near-fall experiences while ambulating in doing activities of daily living, similar to the findings of Arnold and Faulkner, who identified trips as the main precursors to falls in their research.

Srygley et al. (2009) identified slips, trips, and stumbles among multiple causes and reported missteps as associated with reported falls (RR = 3.89). This study's findings were partially consistent with Srygley et al., although they did not analyze gender differences in their study. Time of the 5-meter walk and gender (male) in this study were predictors of near-falls. Time of completion on the 5-meter walk could be seen as comparative to the TUG completion time in the Arnold and Faulkner (2007) study. They found that the elderly were three times more likely to experience frequent falls if TUG scores were greater than 10 seconds or if the elder was older than age 75.

In terms of near-falls incidence, Ryan, Dinkel, and Petrucci (1993) did a small study of community-dwelling elderly. They reported that 50% of their participants could not remember near-falls experiences. Of those who did remember, 70% had a near-fall in the past month for an incidence of 4.7%, in which 7 people had a total of 19 falls. Although this study did not assess upper-arm strength or ability, previous studies of near-falls indicated that the ability to avoid an actual fall depended on the ability to save oneself from hitting the floor using the upper arms (Ashburn, Hyndman, Pickering, Yardley, & Harris, 2008). None of these studies described the racial background or addressed African Americans.

This study's findings of low physical activity levels in African American elderly are supported by the literature (Brownson et al., 2000; Means et al., 2000). The participants in this study reported a mean aerobic activity level of 3.44, which translates to some light physical activity every week.

In the search of the literature on this topic, no articles were found that discussed the impact of near-falls on the elderly African American/Black community. African Americans have been identified as being vulnerable to near-falls with old age, multiple comorbidities, slower functional obstacle times, increased frailty, increased neurological disorders, greater osteoporosis risks, and lower treatment rates. This researcher found few studies featuring the African American elderly, and those studies only had small samples of African Americans or African Americans were underrepresented. The only study found that had an equal representation of ethnic groups was by Brownson et al. (2000), a cross-sectional study finding the lowest levels of physical activity among African Americans and Native Americans. No studies on near-falls and African Americans could be found for comparison with the present study findings. The study findings also supported the observations made by WHO (2010), which indicated that men are poorly represented in the research literature on falls.

Areas for Future Research

It is unknown how many African Americans who experienced near-falls experiences will go on to have an actual fall in the future. This is an area for further research studies. Another area for further research in the elderly Black community-dwelling population would be to examine the precursors to near-falls. Syrgley et al. (2009) studied their population prospectively. Ashburn et al. (2008) did a follow-up on their population in one year.

Strengths and Limitations

Strengths

This study used data obtained from patients, from current electronic medical records (EMR), and from direct observations. Well-researched, established instruments were used and African American elders, an understudied group, were the focus. Patients received an incentive for participation, provided by two grants from Teachers College, Columbia University. In terms of number of participants and assessment of physical activities, this study was consistent with others (Arnold & Faulkner, 2007; Means et al., 2005; Srygley et al., 2009).

Limitations

This correlational study examined relationships between variables. Findings may be specific to this population. This study excluded those who suffer from cognitive impairment, the very population that may be at the greatest risk of experiencing a near-fall (Fuller, 2000). There is the possibility of underreporting near-falls experiences due to memory or embarrassment. Other limitations include the idea that most near-fallers in the last year may have been in wheelchairs or not able to come to the clinic at all. It is unknown how many people were excluded by physicians or how many declined to participate.

Significance of the Research

This research alerts healthcare providers in outpatient and inpatient settings to the need to assess elderly of all races, and especially of the need to assess near-falls. Falls are embarrassing for elderly to discuss among family and professionals. If it is revealed that the elderly are experiencing multiple falls, they become fearful of being labeled as clumsy and a danger to themselves, and possibly of the need for outside assistance.
If falls are embarrassing and not voluntarily revealed, near-falls are even more embarrassing. The elderly in this study described near-falls with terms like “losing control”; specifically, one woman equated it with losing control of one’s bowels or bladder. Loss of control of bodily functions is usually a reason given by family members for increased supervision, thereby making the elder feel more like a child than an adult. When it became apparent that near-falls were more prevalent than falls in this research, several themes emerged from the elderly themselves. They never told of near-falls because they were never asked about near-falls. They are always assessed for falls in the past year. This was done at the inpatient and outpatient level. However, if they are not specifically asked about almost hitting the ground or floor, they will not reveal it. Near-falls are so common to some that they equate it with being a part of being old. As long as they are not injured and do not hit the floor, the elderly carry the experiences of near-falls with them in general, rather than remember a specific number of near-fall experiences.

In this study, near-falls outnumbered actual falls. Although this study may not be representative of other predominantly Black/African American populations or communities, the findings could possibly offer explanations for the low numbers of African Americans/Blacks falling in the literature. Elderly African Americans/Blacks may be experiencing multiple near-falls experiences that are not reported because they are not assessed. They may be embarrassed to report near-falls to healthcare providers and caregivers. The low numbers of hip fractures in Blacks compared to Whites may be explained by Faulkner et al. (2005), who described differences noted in the circumstances of falls in their comparative study of elderly African Americans and Whites. Faulkner et al. found that elderly African Americans were more likely to fall either forward or backward and indoors rather than laterally affecting the hips and outdoors on harder surfaces that may not result in hip fractures. The finding of low physical activity being associated with African Americans is consistent with the literature on falls. It may explain part of the reason for lower documented incidence of falls and why missteps that become falls are so devastating in this community. They are a less active, less fit, sicker population when they experience falls, and so the end result is a very poor outcome.

Changes in Clinical Practice

As a result of this study, participants were made aware of the need to report incidents of near-falls to providers for follow-up on what might be treatable health conditions or safety conditions to improve their safety and decrease potential for injury. Providers were made aware of findings of the study immediately. For those with no known history or assessment of near-falls, providers were alerted via a form letter, (which is included in the Appendix) for further assessment and management. In the inpatient and outpatient community at Mount Sinai, there is no assessment of near-falls. This research increases awareness that providers must identify those who are at risk so they do not go on to become fallers. Once patients are identified, follow-up care in the form of a referral for physical therapy and exercise that is individualized to the patient is required. Exercise can be as simple as daily walking. Physician support motivates patients to initiate and adhere to programs (Gordon et al., 2004). As members of the healthcare team, nurses offer support and encouragement of patients and families in program adherence, monitor patients' progress, and can make suggestions to physicians to ensure patient progress.

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Chapter V

SUMMATION

This dissertation reported on several findings related to predictors of falling in African American elders. Chapter II, “African Americans’ Bone Structure Trajectory,” was a review of the changes that African Americans’ bones undergo from childhood to old age. While it is true that African Americans show increased bone development and strength despite lower intakes of Vitamin D and calcium while young, the body is able to compensate and even thrive up to a certain point. This article pointed out the changes that occur once middle age and menopause occur, reversing those benefits seen in younger ages. Older African Americans are at risk due to advancing age as well as the many diseases and treatments for those diseases that have adverse consequences on bone health. Healthcare providers’ decision making regarding prevention and intervention play a large role in the overall health of this population based on strategies designed with the majority population in mind.

Chapter III explored the relationships among comorbidity, falls efficacy, self-rated health, and physical activity in a sample of ambulatory elderly Blacks presenting to two outpatient clinics at the Mount Sinai Hospital in Harlem in New York City. Descriptive statistics revealed a sample ranging in age from 65-89, female, and widowed, with most in this sample living in apartments on incomes less than $10,000-$29,999. Significant predictors of fall risk score (FRS) were scores on the Modified Falls Efficacy

Scale (MFES) and scores on the Rapid Assessment of Physical Activity (RAPA1), which assessed aerobic activity levels. As scores on the MFES increased, FRS decreased (t = -5.475, p < .001). As scores on RAPA decreased, FRS increased (t = -2.838, p = .005).

Chapter IV explored the relationship between near-falls and demographics, use of an assistive device, a timed walk, and gait. Fifty-seven (47.5%) never or rarely experienced near-falls and 63 (52.5%) occasionally or frequently experienced near-falls. In the final or trimmed model of the backward stepwise logistic regression, time of the 5-meter, observed walk, and being male were significant predictors of near-fall experiences. As time of the walk increased, near-fall risk increased. Being male was significantly associated with having a near-fall experience.

Strengths of the Study

This study adds to small body of research on this population of elderly who self-classify as Black or African American. This study utilized instruments that are established and well researched. The researcher did reliability assessments of these instruments for this study and verified self-reported fall and near-fall information using the electronic medical record (EMR). This study used primary data obtained from the patients and accompanied by researcher observations. This study received the support of the medical and nursing communities at both Mount Sinai clinics and has resulted in the request by the medical director of the Martha Stewart Center for Living for a follow-up on participants who were identified as having frequent near-falls. Interest in identifying patients who are at a high risk of falling but who have not yet fallen can result in proactive interventions that can prevent an actual fall through simple assessment on the part of medical and nursing staff.

Limitations of the Study

This study was limited in the design: it is a cross-sectional study of a small segment of African Americans in an urban population. Because of the cross-sectional design, data on the outcome and predictor variables were collected at the same time. It may be that experiencing falls or near-falls led to lower ratings of falls efficacy or self-rated health. During the observation of the 5-meter walk, the participants knew they were being observed and may have put forward their best attempt at walking, known as the Hawthorne effect. The potential for participants to respond in a manner that was socially desirable was present, as it would be in many studies getting information via self-report. Fall history was cross-checked with the electronic medical record (EMR) for each patient in this study. However, because there was no formal assessment for near-falls, this was strictly self-report unless the patients' providers indicated this in the EMR. There could be underreporting of near-falls, especially if they happened so frequently that they were perceived as being "normal."

This study intentionally omitted persons with cognitive impairment. Cognitive impairment was identified by Fuller (2000) as an age-related contributor of falls in the elderly population. It is unknown how many people were excluded by physicians or how many people declined to participate. Finally, the closed-ended nature of the questions did not allow the researcher to explore the reasons for their answers.

Implications for Practice and Further Research

Near-falls were frequent in this population, with many not reporting such events to their healthcare provider because, as this study revealed, they were never asked to provide that information. The patients were asked by providers at each encounter if they fell in the past year, but not if they had a near-fall in the past year. Patients revealed in speaking with the researcher that they did not tell their healthcare providers of near-fall experiences because they were embarrassed or because no injury occurred. After each encounter with the elder, the researcher provided each healthcare provider with a standardized letter informing them of the results of the EFST and the MFES. The researcher noted which patients were experiencing near-falls so that providers could be alerted to people who may be at risk but are not yet identified. Interventions can only be implemented if practitioners identify the risk. In turn, the population members have to see themselves as being susceptible in some way. In this population, there was a high prevalence of near-falls experiences. The findings of this study are supported by previous studies that associated near-falls with increased fall risk (Ashburn, Hyndman, Pickering, Yardley, & Harris, 2008; Srygley, Herman, Giladi, & Hausdorff, 2009; Stack & Ashburn, 1999; Teno, Kiel, & Mor, 1990), increased near-fall frequency (Arnold & Faulkner, 2007; Ryan, Dinkel, & Petrucci, 1993), and as precursors to actual falls but with a decreased number of actual falls (Gunn, Creanor, Marsden, & Freeman, 2014). These studies were done with Whites primarily.

This study's findings may explain to some degree why the existing body of research on Blacks/African Americans shows a low rate of actual falls. This population has been identified as having a great number of near-falls experiences in the present study. Because they did not actually hit the floor or ground or did not injure themselves, and because healthcare providers fail to ask, elderly African Americans may not see and share problems with near falls until it is too late. The reasons a near-fall does not become a fall are another topic for further examination. This research gives rise to yet another research question: “What are the precursors to near-falls?” It is unknown how many African Americans/Blacks go on to have an actual fall in the future. Much of the research has identified this population as having multiple comorbidities, lower physical activity levels, more sedentary behaviors (Brownson et al., 2000), slower functional obstacle course (FOC) completion times, greater neurological abnormalities, and lower efficacy for carrying out daily activities without falling (Means, Rodell, & O’Sullivan, 2005). Further research needs to be done to also determine whether this population remains upright due to swift reflexes or other factors.

Practitioners need to be aware of changing demographics and tailor the plan of care and interventions to the needs and preferences of individual patients. Addressing a population’s needs and cultural perspective can increase the patients’ active participation in their own care and therefore their cooperation with the plan of care.

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Appendix A

Annotated Bibliography

Adams-Campbell, L. L., Rosenberg, L., Washburn, R. A., Kim, K. S., Palmer, J. (2000). Descriptive epidemiology of physical activity in African-American women. *Preventive Medicine*, *30*, 43-50.

Aims: To examine factors associated with participation in physical activity.

Source: A questionnaire to subscribers of *Essence* magazine.

Sample: Age 21-69, enrolled in Black Women's Health Study; N = 64,101 providing data from all over the United States.

Ethnicity: Primarily African American.

Measures: A 54-item instrument assessing demographics, menstrual/reproductive history, medication history, medical history, cigarette/alcohol usage, number of hours in the past year spent walking, doing moderate exercise or strenuous activity, body mass index (BMI).

Findings: Median age 38; 45% college-educated; nearly a fourth with cardiovascular disease; more than 40% overweight/obese; most never used cigarettes or alcohol. Fifty-seven percent spent an hour or less/weekly walking; 18% participated in moderate activity; 61% strenuous activity. Nineteen percent did no walking, 2% did nonmoderate activity, and 34% did no strenuous activity. Walking for exercise increased with age, increased among those who lived in the West and those who did strenuous exercise. Hours per week doing moderate physical activity increased with age and parity, and were associated with strenuous activity in high school. Strenuous physical activity decreased with age and BMI, but increased with education, residency in the West, nuliparity, never smoking, and having a history of cardiovascular disease or cancer.

Limitations: Findings only applicable to African American women who have a minimum of a high school education, as only 3% in this study had not finished high school.

Agency for Healthcare Research and Quality and Centers for Disease Control. (2002). *Physical activity and older Americans: Benefits and strategies.* Retrieved 9/15, 2010, from https://innovations.ahrq.gov/qualitytools/physical-activity-and-older-americans-benefits-and-strategies.

Aims: To describe and update clinicians and laypersons on the physical activity levels of the aging population in the United States; to describe the consequences of physical inactivity in terms of the physical and financial toll on the individual and societal level; to describe benefits of exercise and a few interventions on the individual and societal level.

Source: A government website.

Sample: N/A.

Ethnicity: Not specified.

Measures: None.

Findings: Many older Americans suffer from chronic diseases; many of these diseases can be prevented or have their consequences reduced if physical activity were increased. Some of these diseases include heart disease, diabetes, cancer of the colon, hypertension, and obesity. Even moderate amounts of daily physical activity result in health rewards. No one is too old to exercise but many older adults do not get the minimum of 30 minutes of physical activity on 5 or more days a week. Walking has remarkable benefits. For ages 65-74, 28%-34% are inactive; for ages 75 and above, 34%-44% are inactive, participating in no leisure-time activity. Women were more inactive than men; this is more common in the older age group. By the year 2030, the elderly population will increase from 35-70 million and from 12%-20% by 2030. Obesity in persons age>65 is 18%, with 40% overweight. Medical expenditures secondary to obesity/inactivity account for 10% of all healthcare costs in the U.S. and costs are likely to increase if trends do not change. Health benefits of physical activity include decreased risk of: mortality, heart disease, diabetes, colon cancer, arthritis, depression, falls, and injuries. Other benefits include increased quality of life and function and increased function in arthritis patients. Recommendations included individual consultation with practitioners about a daily, safe prescription for activity, setting realistic goals, and building slowly. Communities can support environments that are safe and provide social/community support.

Limitations: Readers must take into consideration the original source(s) of data, validation of findings, methods, and funding of the original study.

Alam, N. M., Archer, J. A., & Lee, E. (2004). Osteoporotic fragility fractures in African Americans: Under-recognized and undertreated. *Journal of the National Medical Association, 96*, 1640-1645.

Aims: To investigate whether osteoporosis was diagnosed and treated in this population after fragility fractures. Charts of patients with admissions for fragility fractures were examined.

Source: A retrospective, chart review for a correlational study of patients admitted to Howard University Hospital, an urban teaching hospital. A previous study at this hospital showed low bone mass in people of color ranging from 40-50 years of age.

Sample: N = 58,841 admitted during study period (between January 1992 to December 2002); males aged greater than 50 and females aged greater than 45 years of age with a diagnosis of fracture.

Ethnicity: In this study, 91.6% of the sample was African American and the remainder non-African American; 1,248 had admitting diagnosis of fracture; 491 or 30% had fragility fracture, and of these, 323 (65%) fractured from low impact falls. Of the 323 with low-impact fragility fracture, 61.3% were women, age 74.8 years, mostly African American (91.6%). A diagnosis of osteoporosis was made in only 29 or 9% of the 323 with low-impact fragility fracture. Of the 29, only 2 were diagnosed with osteoporosis before admission, 1 during admission, and 26 during discharge. Those with diagnosis of osteoporosis by x-ray and pathology reports were put into Group 2. Those with fragility fracture but no diagnosis of osteoporosis were placed into Group 1; they were noted to be 5 years younger than Group 2, which was statistically significant.

Measures: Risk factors for osteoporosis including fracture history, BMI, ethnicity, family history, alcohol and tobacco use, and medications that could reduce bone mass.

Findings: None of the African Americans in this study had DXA scan to diagnose osteoporosis as an underlying cause of fragility fractures. Of the 29 patients with osteoporosis in Group 2: 69% were women, 40% had low BMI; femur fractures were more prevalent in women age>75; 3 patients (12%) had more than 1 fracture, 35% had a prior history of fractures. In Group 2: 31% took alcohol, 35% had a history of smoking. Pharmacotherapy: out of 26 patients (26 out of 29 charts were available), 5 took anti-osteoporotic medications, 1 took bisphosphonate treatment. African Americans had lower osteoporosis rates but similar risk factors; no DXAs were done in >90%. Primary risk factors: female, old age, alcohol/smoking history, decreased BMD, glucocorticoids. Guidelines for diagnosis and treatment to decrease morbidity and mortality will decrease costs to society. Findings do not support statistically significant association between disposition to nursing home and diagnosis of osteoporosis.

Limitations: Not an interventional study so cause and effect cannot be established; problems noted by researchers with ICD-9 coding but they do not specify what those problems were; cannot generalize findings, not a probability sample.

Aloia, J. F. (2008). African Americans, 25-hydroxyVitamin D and osteoporosis: a paradox. *The American Journal of Clinical Nutrition, 88,* 545S-550S.

Aims: To examine some of the reasons why the African American population has lower serum 25-hydroxyVitamin D levels but lower fracture risks; to examine the factors that affect bone loss.

Source: A literature review.

Sample: Not an empirical study.

Ethnicity: Comparing African Americans to Whites.

Measures: Methods used in search not addressed.

Findings: Comparing African American to Whites with regard to bone mass, children age 6-16 were found in a NHANES III study to have a bone mineral density advantage beginning in childhood at age 6, increasing during adolescence. Bone loss began at approximately the same age among adults, with an increase during menopause and accelerating among African Americans with age more rapidly than

Whites. Polymorphic differences between the races: few studies that separated the African genotypes from the European genotypes in African Americans. Obesity has a paradoxical relationship with Vitamin D. Obesity is more prevalent in African Americans and offers some protection from fractures from adding padding, increased body weight may stimulate bone formation, increased estrogen may protect from bone loss, increased bone mass is related to increased muscle mass. Bone turnover is lower among African Americans but only in adulthood, few studies among children and existing studies show that bone turnover increases with aging. Longer bone formation time allows for better quality of bone for form, possibly decreasing fracture risk due to osteoblast apoptosis. Shorter hip axis offers protection to African Americans. Fall dynamics protect African Americans, who tend to fall forward using hands to break falls and prevent hip fractures. Whites tend to fall laterally, increasing risk of hip fractures. No statistically significant difference in fall rate in Study of Osteoporotic Fractures (SOF), although Whites fell more but decreased rate of falls for African Americans explains fewer fractures. African Americans had better renal conservation of calcium, lower calcium excretion, lower concentration of bone turnover markers, higher parathyroid hormone levels. Calcium supplementation for African Americans in midlife did not prevent bone loss. Skeletal resistance to PTH might hold true for younger but not elderly African Americans. In a study of the Baltimore Men's Osteoporosis Study, the only longitudinal study of African American men found there was increased bone loss among those age>75.

Limitations: Methods in searches, determining quality of studies included and excluded.

American Academy of Orthopedic Surgeons. (2007). *Osteoporosis and falls.* Retrieved 1/1/2011, 2010, from http://www.orthoinfo.aaos.org/topic.cfm?topic=A00120

Aims: To define osteoporosis; to examine the incidence of osteoporosis in the U.S.; to identify factors contributing to osteoporosis.

Source: A website for professionals.

Sample: N/A.

Ethnicity: Not specified.

Measures: N/A.

Findings: Osteoporosis defined as "porous bone" occurs when bone calcium is lost faster than it is replaced. Ten million Americans have osteoporosis; 3.4 million have low bone mass and over 1.5 million have osteoporosis-related fractures. Over half of women age>50 will have a fracture secondary to osteoporosis at some point; 20% of men have osteoporosis. Contributing factors include advancing age, Asian or Caucasian race, inadequate weight bearing exercise, postmenopausal estrogen decreases, excessive cortisone or thyroid hormone levels, smoking and excess alcohol intake, inadequate weight-bearing exercise, decreased calcium intake and/or absorption, decreased Vitamin D intake/absorption.

Limitations: Readers must take into consideration the original source(s) of data, validation of findings, methods, and funding of the original study.

American Academy of Pediatrics. (2014). AAP stresses the importance of bone health in childhood. https://www.aap.org/en-us/about-the-aap/aap-press-room/Pages/AAP-Stresses-the-Importance-of-Bone-Health-in-Childhood.aspx.

Aims: To stress the importance of addressing nutrition in early childhood and adolescence for the building of strong bones at the earliest stages possible to reduce the likelihood of bone loss, also known as osteoporosis.

Source: A government-funded website.

Sample: N/A; this is not a research study.

Ethnicity: N/A; no specific ethnic group is addressed in this public service information.

Measures: N/A; this is not a research study.

Findings: Healthy infants received their nutrition from either breast milk or some form of infant formula. It is estimated that 70-80% of calcium intake comes from milk or dairy products. Children and adolescents with recurring low-impact fractures or medical diagnoses that are associated with bone density reduction should be screened for adequate Vitamin D intake. Weight-bearing exercise and activity help children to strengthen bones.

Limitations: N/A; this is not a study.

American Geriatrics Society. (2015). AGS/BGS clinical practice guideline: Prevention of falls in older persons. *American Geriatrics Society,* http://www.americangeriatrics.org/health_care_professionals/clinical_practice/clinical_guidelines_recommendations/prevention_of_falls_summary_of_recommendations.

Aims: To provide recommendations to healthcare providers who care for elderly adults who will help providers in their assessment of elderly and in their recommendations to prevent falls for elders who reside in care facilities as well as those who reside in the outpatient community.

Source: A government website with information directed for healthcare professionals.

Sample: All elderly, whether they reside in the community or in a long-term care facility.

Ethnicity: N/A.

Measures: N/A.

Findings: Detailed fall histories are recommended, medication review, extrinsic factor assessment, physical and neurological assessment, assessment of functional ability including use of adaptive equipment.

Limitations: N/A.

Andresen, E. M., Wolinsky, F. D., Miller, J. P., Wilson, M. M., Malmstrom, T. K., & Miller, D. K. (2006). Cross-sectional and longitudinal risk factors for falls, fear of falling, and falls efficacy in a cohort of middle-aged African Americans. *The Gerontologist, 46*, 249-257.

Aims: To identify risk factors for falls, fear of falling (FOF), and falls efficacy in this population.

Source: A correlational study with repeated measures utilizing a cross-sectional examination of baseline data (in home) with longitudinal data examined prospectively in 2 annual follow-up interviews (telephone).

Sample: N = 998 (76% participation) of 2 strata: poor, inner-city and northwest suburbs of St Louis born between 1936-1950 with a Mini-Mental State Exam Score >16, African American Health (AAH) study.

Ethnicity: African American males and females.

Measures: Falls: 3 questions: Did you fall in the past 2 years? How many times did you fall in the past 2 years? Did you suffer any injuries requiring medical treatment? Are you afraid of falling and if yes, somewhat or very? Falls Efficacy: using the Falls Efficacy Scale with scoring categorized as lowest quintile of scores <90 vs. others. Risk factors include demographics: age, gender, marital status, living arrangement, race consciousness; socioeconomic status: education, subjective objective income, financial barriers; neighborhood desirability via report on environment and independent observer using a 4-item rating scale for participants and a 5-item scales for independent observers (no validity/reliability information); disability and biomedical markers via self-report of: cancer, diabetes, arthritis, stroke, increased systolic and diastolic blood pressure, body mass index, weight loss, percentage of body fat; functional status and performance: vision, hearing, cognition, depression, physical activities, nine measures of functional status and physical performance measures.

Findings: 100 lost to second-year follow-up interviews. Higher level of education and symptoms of depression were associated with falls, past history of falls, female gender, and fear of falling at baseline assessment. Unable to show an association between quality of neighborhoods and falls/fear of falls/decreased efficacy. Some possibilities: the tools used to assess this association were not sensitive enough (no reliability or validity given), were biased (subjective observation) or not appropriate. The largest predictor of prospective falls was prior fall at baseline (OR = 2.51). For women: gender was protective for previous injurious falls, was protective with smaller effect for prospective falls. Low neighborhood desirability increased FOF prospectively but was not significant and was the opposite cross-sectionally. The greatest predictor of FOF in subsequent 2 years was FOF at baseline (OR = 8.14).

Diabetics scored lower on body function limitations, activities of daily living (ADLs), instrumental activities of daily living (IADLs), depressive symptoms, and this was associated with increased risk of low falls efficacy. The researchers acknowledged a need to study what behaviors may be predictors for falls and may account for the social and environmental factors that are related to falls, fear of falls, and low falls efficacy. No interaction occurred between age and gender, yet findings indicated that further research is needed to explain why a younger group is just as fearful of falling as an older group.

Limitations: Activity restriction not assessed, self-report heavily used, FES (high ceiling; because of the large number of participants scoring perfectly on the FES, researchers chose instead to use a dichotomous score to compare those on the lowest quartile to others, not stating how this change may affect reliability or validity), no reliability/validity on tools, no uniformity of assessments.

Arden, N. K., Crozier, S., Smith, H., Anderson, F., Edwards, C., Raphael, H., & Cooper, C. (2006). Knee pain, knee osteoarthritis and the risk of fracture. *Arthritis Care and Research, 55*, 610-615.

Aims: To examine the relationship between knee pain in osteoarthritis (OA) and fractures.

Source: A 3-year, randomized, controlled, double blind, placebo-controlled trial with 1 group getting 300,000 IU of Vitamin D together with the intramuscular (IM) influenza vaccine yearly over 3 years and the other group randomized to receive a matching placebo together with an IM influenza vaccine yearly over 3 years.

Sample: N = 6,641 males and females age>75 recruited from general practices who presented to receive annual influenza immunizations; participants with cancer, on Vitamin D supplementation, with hip replacements, under treatment for osteoporosis, with renal failure or stones, hypercalcemia or sarcoidosis were excluded.

Ethnicity: United Kingdom, no race specified but assumed White/Caucasian.

Measures: Nonvertebral fractures every 6 months via questionnaire from the European Prospective Osteoporosis Study; a mannequin to display fracture sites; fall history during the intervening 6 months via questionnaire; knee pain via questionnaire: pain in or around the knee on most days at least 1 month? Has a doctor told them they have knee osteoarthritis? Can they quantify their pain on a 5-point scale?

Findings: Those with knee pain were mostly female, used a walking aid, and had higher risk of nonvertebral fractures with findings similar among those with OA. Eighty-nine percent of those diagnosed with OA reported knee pain vs. 31% without such diagnosis. Knee pain sufferers more likely to fall at least once during follow-up; those with knee pain and OA used walking aids the most (34.1% and 42.2%). Use of walking aids increased fall risk (HR 1.34, 95%, CI 1.25-1.44). Severe knee pain increased risk of falls compared to those with no knee pain. Use of a walking aid associated with hip fracture risk (HR 2.25, 95%, CI 1.38-3.68). Those with the greatest pain had increased risk of all nonvertebral fractures. Moderate knee pain and severe knee pain (HR 1.33, 95%, CI 1-1.78). No knee pain (HR 2.20, 95%, CI 1.58-3.07.

Limitations: The effect of Vitamin D on falls and fractures was not established; pain questionnaires subject to recall because it was administered after the study; those excluded were the most likely to have fractures.

Arnold, C. M., & Faulkner, K. A. (2007). The history of falls and the association of the timed up and go test to falls and near falls in older adults with hip osteoarthritis. *BMC Geriatrics, 7,* 7-17.

Aims: A description of fall risks, history and nature of falls and near falls in community-dwelling elderly with osteoarthritis.

Source: Retrospective, observational, empirical study.

Sample: N = 106, males and females, with females = 77 and males = 29 recruited from ads, phone and physical screening done.

Ethnicity: Not specified.

Measures: Falls and near falls interview (how many in the past year, where, cause, circumstances, frequency with an estimation of near falls frequency); Mini-Mental State Exam (MMSE); pain in the hip >6 months; Timed Up and Go test (TUG) with a practice trial.

Findings: 59 falls from 48 respondents; 40% under age 75 fell in the past year, 53% age 75 and over fell in the past year. Falls were trips, slips, lost balance via ambulation, ascending/descending stairs, reaching and getting up from the chair or bed. Participants were 3 times more likely to be frequent near fallers if TUG was >10 seconds or if age>75. TUG was more accurate predictor of near falls than falls.

Limitations: Sample may not be representative of those with osteoarthritis; study participants were aware of the intentions of the study; those with increased risk of falling may have participated; sample size too small to test ability of TUG to classify fallers.

Arnold, C. M., Sran, M. M., & Harrison, E. L. (2008). Exercise for fall risk reduction in community-dwelling older adults: A systematic review. *Physiotherapy Canada, 60,* 358-372.

Aims: To examine the impact of exercise on falls and fall risk factors and outcome measures of fall risk.

Source: A systematic review of the literature.

Sample: 156 abstracts retrieved, N = 22 reviews meeting internal validity cut-off.

Ethnicity: Not specified.

Methods: Using MEDLINE, CINAHL, AMED, PEDro(EMBASE) search of articles in English from January 2000-July 2006 using the search terms accidental falls, risk factors, exercise, rehabilitation, physical activity, physical fitness, physical performance, sports, motor activity, exercise techniques, physical therapy techniques. Included were randomized, controlled trial using control, sham control or another intervention except exercise; had exercise/physical activity as an intervention; included community-dwelling (defined) elderly over age 50.

Findings: Age greater than 50 diverse populations as seen by physical therapists; female to male ratio 3:1 or 4:1; outcome measures were muscle strength, functional tasks, balance, gait, fear of falling, self-report of function, composite measure of function for a fall risk score. Muscle strength: 6/22 measured of the hip, knee, and ankle with 1 showing significant improvement in lower extremity postintervention and intervention frequency varying from every two weeks to biweekly. Balance: 15/22 used 16 measures, either static or dynamic with 9/15 showing balance improvement due to intervention. Gait: used 6- or 12-minute walk, 7/22 gait velocity. Composite: 2/22 used Physical Profile Assessment (PPA), a valid/reliable instrument. Falls: monthly postcards, some with follow-up calls, cognitive impairment an exclusion criterion in 11/22 studies. Intervention: 13/15 had group objectives to improve balance/strength, 6/15 follow-up and majority 17/19 showing intervention with a positive effect on fall risk reduction. Functional status: use of SF-12, SF-36, disability score, general health assessment. Falls efficacy: 10/22 measured, 3/22 Tai Chi improved falls efficacy, 2/22 had an educational component combined with exercise.

Limitations: Balance interventions did not detail progression, complexity or duration; authors failed to clearly explain measurements of falls efficacy and did not include reliability/validity of instruments; lack of a single instrument to clearly differentiate falls efficacy, fear of falling, balance confidence; follow-up calls not always documented on falls assessment.

Ashburn, A., Hyndman, D., Pickering, R., Yardley, L., & Harris, S. (2008). Predicting people with stroke at risk of falls. *Age and Ageing, 37,* 270-276.

Aims: To identify those people who are at risk of falling while still in the hospital poststroke and who are at risk of falling while in the community after being discharged.

Source: A single-blind, repeated measures correlational study with data collected retrospectively within the first two weeks of admission, 2 weeks postdischarge and again at 12 months postdischarge from the hospital to home.

Sample: N = 122 participants who were mobile independently before a stroke who were identified at discharge from the hospital, mean age 70.2 years,

Ethnicity: Not specified.

Measures: Demographics (age, gender, time hospitalized, side of lesion, Oxford Stroke Classification of cerebral infarct); past history of stroke(s); any visual, musculoskeletal of vestibular impairments; neurological conditions; performance based tests of balance, function, mood and attention using Berg Balance Scale, Nottingham Extended ADL Scale, Rivermead Motor Assessment; unilateral visual neglect screen; four subsets of the Test for the Everyday Attention (TEA); 0 test of attention; Hospital Anxiety and Depression Scale done in the participants' homes; falls using diaries of fall events with reminders via phone or letter. Repeat fallers defined, near falls defined.

Findings: Complete data available on 115 participants; 63 had one or more falls, 48 had repeated falls, and 62 had near falls. No significant difference between repeat and nonrepeat fallers. Age range wide (between 21-92), with even distribution of right and left hemispheric involvement, the majority of persons having their first stroke with 10-330 days lapsing between stroke and visit time posthospital discharge. Six potential predictors of repeat falling: history of near falling while in the hospital, Rivermead leg and trunk score, Rivermead upper limb score, Berg Balance Test score, mean functional reach, Nottingham extended ADL score. History of near fall ($p = 0.007$) and Rivermead upper limb scores ($p = 0.052$) were significant. Forward selection of the 6 variables gave a predictive score: 60% was the proportion of participants who were repeat fallers and predicted to be; and a proportion of 70% for the persons who were predicted not to be repeat fallers. Rivermead upper limb score showed that people who were unstable while in the hospital would be less likely to save themselves from falling using their arms and were at highest risk, particularly repeat fallers.

Limitations: Small sample size; no validity/reliability of instruments used; unable to determine how the sample compares to others in the same hospital, other hospitals in or out of the same area; unable to generalize the findings to a greater, more diverse population.

Axer, H., Axer, M., Witte, O. W., & Hagemann, G. (2010). Falls and gait disorders in geriatric neurology. *Clinical Neurology and Neurosurgery, 112*, 265.

Aims: To examine the relationship between falls among elders with and without cognitive and gait disturbances; to examine falls secondary to neuro-degenerative diseases.

Source: This is not a study but a review based not on multifunctional interventions but on disorders of the central nervous system (CNS) affecting the elderly.

Sample: Elderly aged >65.

Ethnicity: Not specified.

Measures: Measures of gait used by clinicians examining patients including general physical evaluation, gait evaluation, standardized measures of mobility (Tinetti Mobility Index, Berg Balance Scale, Timed Up and Go, 6-minute walk and one-legged balance tests).

Findings: Prevalence of gait disorders 82% by age 85 and older. Abnormalities of gait/stance and neurological conditions are strongly associated with falls.

Assessment includes thorough history, physical/medical exam, balance assessments. Syncopal falls: usually self-limiting, with rapid recovery, with incidence of 6%/year and recurrence of 30%/year among institutionalized elders; incidence of 16.9% for males and 19.5% for females age 80 and older. Epilepsy: manifested as dizziness, a short stare or prolonged confusion, with low incidence of convulsions but longer state of confusion and reorientation. Drugs used in treatment among this age group decrease bone mineral density (BMD). Gait disturbances and dementia: for low-level deficits peripheral, sensory or motor impairments are often compensated for if cognition is intact. Intermediate level: postural and motor responses, sensory and motor modulation defects. High level: deficits seen in executive function, planning and intent resulting in gait disturbances. Motor dysfunction and mild cognitive impairment (MCI): increased risk of falls due to postural sway, small decreases in Mini-Mental State Exam (MMSE) scores and history of falls. Alzheimer's Disease (AD): the most common cause of dementia (60%), with gait dysfunction caused by executive function disturbance and loss of attention control. Associated with gait apraxia of loss of use of lower limbs to walk, increasing fall incidence. Vascular Dementia (VD): predisposing conditions include hypertension, arteriosclerosis, and more common to have gait/balance disturbances with VD vs. AD. Little data on incidence of falls in VD patients. Normal Pressure Hydrocephalus (NPH): triad of gait disturbance, cognitive impairment, urinary incontinence. Other characteristics include slow, variable stride, low foot clearance, frontal lobe dysfunction, and propensity to fall backwards. Dementia with Lewy Bodies: more frequent falls vs. AD (10% vs 1%); greater severity of tremors, body bradykinesia, rigidity, poorer gait, chair rise time, frequent falls, syncope, hallucinations, sensitivity to neuroleptics vs. PD patients. Fronto-temporal dementia: 3-10% of demented; exhibit language disturbances, progressive, nonfluent aphasia with symptom onset in presenile period (45-65 years), involuntary trunk movements; data lacking. Parkinson's Disease: progressive; associated symptoms include freezing gait, postural instability, resting tremors, bradykinesia, rigidity; sufferers 5x more likely to have fall-related injuries. Orthostatic hypotension may cause falls and may be associated with medications used to treat condition. Multiple System Atrophy (MSA): combo of symptoms with Parkinsonian predominating (80%), cerebellar dysfunction (20%), and autonomic failure. Progressive Supranuclear Palsy (PSP): falls from postural instability, inability to counterbalance falls. Cortico Basal Degeneration (CBD): low progressing disorder with asymmetric limb clumsiness; rigidity may or may not be present. Goals of care with all these disorders: identification and treatment to slow progression, improve gait through exercises/physical therapy, review medications for interactions.

Limitations: Identification of methods for obtaining review articles not identified short sections on treatments and care guidelines for clinicians.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191-215.

Aims: Bandura offered a hypothesis: expectations of self-efficacy determine whether, how much, and how long a coping behavior will be sustained in light of obstacles. Efficacy vs. outcome expectations are defined. Efficacy expectations are whether or not one can successfully execute a behavior that will produce an outcome. The outcome is the long-term goal. Outcome expectations are whether or not one estimates that a given behavior will lead to certain outcomes. Self-efficacy comes from four main sources: personal accomplishments, vicarious experiences, verbal persuasion, and physiological states. Bandura went on to explain and give examples of the four sources. An experiment with severe phobics getting treatments in which differing levels of efficacy were expected to examine the relationship between self-efficacy and behavioral change.

Variables: Level, strength, generality of efficacy expectations at critical junctures in the change process. Experimental group got 18 tasks they considered themselves capable of in increasing threat. The control group received assessments but no treatments.

Findings: Experiences based on performance accomplishments had higher, more generalized stronger efficacy expectations than efficacy expectations based on vicarious experience.

Bandura, A. (2008). *Self-efficacy defined.* Retrieved March 29, 2011, from http://www.des.emory.edu/mfp/BanEncy.html

Aims: To explain, define, and give examples of the concept of self-efficacy and how it is applied in life situations.

Source: A chapter of a textbook on human psychological processes.

Sample: N/A, this is not a study.

Ethnicity: N/A, none specified.

Measures: None.

Findings: Self-efficacy is a person’s belief that he or she can perform a specific activity successfully, with self-efficacious people taking further steps to increase mastery. Lack of self-efficacy results in people avoiding activities, using these experiences as excuses to further avoid a particular activity while losing confidence when faced with obstacles. Four sources of self-efficacy are: mastery (success built on past successes); vicarious experiences (seeing others like oneself achieving success); social persuasion (praises from others); and physiological states (perceptions that fatigue or physical discomfort during an activity is a sign of weakness or lack of proficiency at an activity). Self-efficacious people use the four processes affecting human behavior differently than people lacking efficacy. Self-efficacious people use cognitive process to plan purposeful activities that they know they can achieve. They also use motivational processes for goal-directed activities that they achieve through effort; failure is viewed as lack of effort instead of ability. Affective processes in efficacious people are anxieties but they are manageable. Selection processes in efficacious people are choices of activities and environments that help rather than hinder goal achievement. As people age, changes in their physical abilities may force them to re-evaluate what they can and cannot do successfully, readjusting or relearning activities later in life.

Limitations: N/A.

Barrett-Connor, E., Siris, E. S., Wehren, L. E., Miller, P. D., Abbott, T. A., Berger, M. L., Santora, A. C., & Sherwood, L. M. (2005). Osteoporosis and fracture risk in women of different ethnic groups. *Journal of Bone and Mineral Research, 2*(185), 194.

Aims: To examine the frequency of low bone mineral density and the relationship between low bone mineral density (BMD) and fracture incidence over the past year.

Source: Observational study using NORA (National Osteoporosis Risk Assessment) for a questionnaire and bone mineral density follow-up 6 and 12 months later.

Sample: N = 197,848 women age 50 and over without a diagnosis of osteoporosis, without bone mineral density testing, and not on bone specific medications.

Ethnicity: White: 179,470; Black: 7,784; Asian: 1,912; Hispanic: 6,973; Native American: 1,708.

Measures: Standardized questionnaire on age, ethnicity, risk factors such as weight, body mass index (BMI), years after menopause, fracture history, maternal osteoporosis history, calcium, steroid, diuretic, estrogen and thyroid hormone use; alcohol and cigarette use; exercise habits. BMD was done at the heel using SXA and at the finger using DXA. Osteopenia was defined as having a BMD 1 and 2.5 SD below average young adult mean. Osteoporosis was defined as BMD <2.5 SD below average young adult mean.

Findings: Using World Health Organization (WHO) criteria, 11.9% Native Americans, 10% Asians, 9.8% Hispanics, 7.2% Whites, and 4.2% were osteoporotic. Osteopenia was diagnosed in 50.1% Asians, 46.5% Hispanics, 44.5% Native Americans, 39.6% Whites, and 28.1% Blacks. Clinical fractures reported totaled 2,414 of the hip, spine, forearm, wrist or rib. Fracture rates increased for each ethnic group as age increased. Generally, Blacks and Asians had the lowest fracture rate/age group while Whites and Hispanics had the highest. Blacks, Whites, and Hispanics over age 80 had markedly higher fracture rates than women in younger age groups; however, age effect was less obvious among the oldest Asians and Native Americans.

Limitations: Possible selection bias due to the voluntary participation of elderly who had a physician and no known osteoporosis; only peripheral bone mineral density measured and results may vary at different sites.

Bell, N., Shary, J., Stevens, J., Garza, M., & Edwards, J. (1991). Demonstration that bone mass is greater in black than in white children. *Journal of Bone and Mineral Research, 6*(7), 719-723.

Aims: To determine if there is a difference in bone mineral density (BMD) between Black and White children.

Source: A cross-sectional comparative study.

Sample: N = 106. Children were recruited verbally and with letters to schools. Children were ages 7-12 and girls were non-menstruating.

Ethnicity: Black boys = 20, Black girls =18, White boys =33, White girls =35.

Measure: Bone mineral density (BMD) of the forearm and mid-radius of the nondominant arm using single-photon absorptiometry, BMD of the lumbar spine, trochanter and femoral neck done using dual photon absorptiometry.

Findings: Elevated BMD in Black boys compared to White boys at the trochanter and femoral neck. Black girls compared to White girls had increased BMD at the mid-radius, lumbar spine, trochanter, and femoral neck. R-squared resulting in 49-66% of the variance in BMD was due to race, sex, age, and body weight.

Limitations: Not much was said about inclusion criteria and nothing was said about exclusion criteria for this small study. Moreover, nothing was said about the population from which this sample was drawn so it cannot be implied that findings from this study can be applied to another sample from another community.

Biderman, A., Cwikel, J., Fried, A. V., & Galinsky, D. (2002). Depression and falls among community-dwelling elderly people: A search for common risk factors. *Journal of Epidemiology and Community Health, 56*, 631-636.

Aims: To find risk factors that are predictors of falls and depression in a sample of community-dwelling elderly.

Source: A cohort study with follow-up the following year.

Sample: N = 361 men and women from the General Sick Fund; males = 152, females = 209. At one-year follow-up, N = 283 (78%). Participants were members of an urban community primary care clinic in Beer Sheva, Israel.

Ethnicity: No Blacks in this study, only Israelis.

Measures: Outcome variables were falls and depression. Covariates were demographics, functional status, self-reported health (predictor variable), and change in health status, clinic visits, hospitalizations, chronic medical problems, and medication usage.

Findings: Five risk factors were identified as discriminating fallers from non-fallers (86%) and between those with symptoms of depression and those without (76%). Those risk factors are poor self-rated health, poor cognition, those with impairments in activities of daily living, those with 2+ clinic visits in the past month, and those with slow walking speed.

Limitations: Self-report was the only means of assessment of fall status; correlational, nonexperimental design; results may be different among persons of other more diverse populations.

Bilotta, C., Nicolini, P., Case, A., Rossi, S., & Vergani, C. (2012). Frailty syndrome diagnosed according to the Study of Osteoporotic Fractures (SOF) criteria and adverse health outcomes among community-dwelling older outpatients in Italy: A one-year prospective cohort study. *Archives of Gerontology and Geriatrics, 54*, e23-28.

Aim: To determine the ability of the Study of Osteoporotic Fractures (SOF) criteria to predict adverse health outcomes in a population of community-dwelling elderly.

Source: A prospective cohort study.

Sample: N = 302 enrolled at baseline, N = 226 providing final data. Participants were outpatients age >65 referred to the clinic for multiple falls, weight loss, functional decline, and multiple medication use.

Ethnicity: No Blacks in this study; participants were from Milan, Italy.

Measures: Covariates in this study were age, gender, years of education, civil status, yearly income, weight, height, body mass index (BMI), comorbidity assessed with the Cumulative Illness Rating Scale Morbidity (CIRS-m), basic and instrumental activities of daily living (BADL, IADL) as described by Lawton and Brody, dementia and depression per the *Diagnostic and Statistical Manual of Mental Disorders* 4th edition (DSM-IV-TR); frailty (SOF index). The dependent or outcome variables were adverse outcomes at the 1-year follow-up which included any fall, any admission to the emergency department (ED), any hospitalization, nursing home admission, and death 1 year after the baseline assessment.

Findings: Frailty was associated with increased falls risk (OR 2.01, 95%, CI 1.05-3.83, p = .035), hospitalization (OR 2.08, 95%, CI 1.02-4.24, p = 0.045), death (OR 3.07, 95%, CI 1.02-4.24, p = 0.045) after adjusting for demographics, comorbidity, socioeconomic status, severe dependence in BADL. Frailty was associated with increased risk of ED admission (OR 1.83, 95%, CI 1.02-3.35, p = 0.049) after adjusting for all of the above except for severe BADL dependence. Two hundred and thirty-one (87.2%) still lived at home, 9 (3.4%) lived in a nursing home, 25 (9.4%) had died.

Limitations: Findings may not be applicable to other populations; number of people lost/missing cases at follow-up.

Bischoff-Ferrari, H. A., Orav, E. J., & Dawson-Hughes, B. (2008). Additive benefit of higher testosterone levels and Vitamin D plus calcium supplementation in regard to fall risk reduction among older men and women. *Osteoporosis International: A Journal Established as Result of Cooperation between the European Foundation for*

Osteoporosis and the National Osteoporosis Foundation of the USA, 19(9), 1307-1314.

Overview: Authors acknowledged limited studies examining effect of the sex hormones DHEA-S and SHBG on fall risk in elderly. This study aimed to examine this association.

Sample/Ethnicity/Age: N = 445; males = 199; females = 246; age 71 years; BMI = 26.7-27. No information on race.

Source: Secondary data analysis of Boston Stop It Trial, a 3-year, double-blind, randomized, controlled trial.

Variables/Tools: Dependent variables include fall risk, sex hormone levels. Independent variables include BMI, physical activity (PASE), tobacco/alcohol use and comorbidities (baseline questionnaires), total and leg lean body mass (DPZ-L).

Findings: In males, testosterone levels >5.68ng/dl had 78% lower fall odds vs. men with levels <3.77 ng/dl. Women with testosterone levels >0.49 had 66% lower fall odds vs. women with levels <0.20ng/dl. Both sexes benefitted being in top sex specific quartiles and randomized to Vitamin D and calcium. Falls were defined.

Limitations: No explanation in summation of comorbidity scores, no validity/reliability of PASE, questionnaires or DPX-L.

Bohannon, A. D. (1999). Osteoporosis and African American women. *Journal of Women's Health and Gender Based Medicine, 8,* 609-615.

Aims: To shed light on the possible reasons clinicians may believe elderly African Americans may be at lower risk; to examine factors shared and factors that may raise elderly African Americans' risk of osteoporosis.

Source: A review of the literature.

Sample: N/A.

Ethnicity: African Americans and Whites.

Measures: N/A; this is a review.

Findings: Both races face similar risk factors for the development of osteoporosis such as advancing age, low body mass index (BMI), and alcohol and cigarette consumption. Some factors considered by clinicians that may cause them to believe African Americans may be at lower risk include the fact that African Americans have higher bone mineral density in younger years, a factor that may result in African Americans taking longer to reach a fracture threshold compared to Whites; lower bone turnover; decreased urinary excretion of calcium despite decreased calcium and Vitamin D intake; lower serum resorption markers despite having skeletal muscle resistance to parathyroid hormone; shorter hip axis. Factors increasing African Americans' risk for osteoporosis include autoimmune diseases such as asthma and lupus; endocrine disorders such as diabetes, hyperpara-thyroidism, thyrotoxicosis; lactose intolerance; certain medications such as anti-convulsants, glucocorticoids, and methotrexate. African American women past the age of 65 have lower rates of screening, with the current screening tool measuring bone mineral density being used on people at risk instead of as a general screening instrument. One out of 9 African American women over the age of 65 is prescribed estrogen replacement therapy (ERT). No information is given on the number of White women prescribed ERT.

Limitations: Few studies available at the time of this article involving large sample sizes of African American women. More studies with large sample sizes are needed in this population as the minority population is expected to increase in the coming years in America. Clinicians need to address the problems that are found in this population that is increasing in size.

Borson, S., Scanlan, J., Brush, M., Vitaliano, P., & Dokmak, A. (2000). The Mini-Cog: A cognitive “vital signs” measure for dementia screening in multi-lingual elderly. *Journal of Geriatric Psychiatry, 15*, 1021-1027.

Aims: To compare the Mini-Cog to the Mini-Mental State Exam (MMSE) and to the Cognitive Abilities Screening Instrument (CASI).

Source: A comparative study

Sample: N = 249; females = 173, males = 76; those with probable dementia = 129, those without dementia = 120.

Ethnicity: Non-Hispanic Whites = 31, White Hispanics = 24, Asian Pacific Islanders = 114, African Americans = 61, Native Americans = 18, mixed = 1.

Measures: Clinical Dementia Rating Scale (CDRS), Clock Drawing Test (CDT), Mini-Mental State Exam (MMSE), Cognitive Abilities Screening Instrument (CASI), Consortium to Establish a Registry for Alzheimer’s disease (CERAD). History of cognitive decline and current functioning using all available cognitive, medical, and lab data; evaluation with a knowledgeable informant present and in the subjects’ primary language; sensitivity, specificity and diagnostic value of the three instruments.

Findings: Mini-Cog was first among others in sensitivity with 99%, had a diagnostic value of 96% and a specificity of 93%. MMSE was the least sensitive at 91%, had a specificity of 92% and a diagnostic value of 92%. CASI had a sensitivity of 92%, a specificity of 96% and a diagnostic value of 94%.

Limitations: Authors indicated limitations are similar as those for longer tests; reliability of any tests depends on the training and skills of the person administering the test.

Bowles, J., Brooks, T., Hayes-Reams, P., Butts, T., Myers, H., Allen, W., & Kingston, R. S. (2000). Frailty, family, and church support among urban African American elderly. *Journal of Health Care for the Poor and Underserved, 11*, 87-99.

Aims: To answer the following questions: What is the prevalence of frailty in this population? What are the indicators of social support in frail compared to nonfrail elderly? What correlations can be found between frailty and social support and use of community services?

Source: A nonexperimental, cross-sectional design; a correlational study.

Sample: N = 507 over age 60 interviewed between January 1995 and May 1996 in an urban community of South Central Los Angeles. Participants were recruited door to door from community centers, churches, health fairs, referral from group homes, DREW/RAND center projects.

Ethnicity: African Americans.

Measures: Functional Status Questionnaire (FSQ) subscale (no validity or reliability given), measures functional impairment; American College of Physicians Subcommittee on Aging, 1 question w/sensitivity and sensitivity given on a similar question (78% and 87%, respectively) assessing depression; Incontinence: 2 questions, no tool, no validity/reliability/sensitivity given; Falls: 1 question, no tool; family and church support: 6 questions from National Survey of Black Americans, no sensitivity/validity/reliability given. Acknowledgment that there is no single encompassing definition of frailty, but it is defined as having one or more of four syndromes: functional, incontinence, falls, and depression.

Findings: The use of self-report tools and adaptations from the National Survey of Black Americans which could result in participants giving answers that were desirable to observers, failure to report judgmental, embarrassing situations and changes to the reliability/validity of the assessment tools. The participants were mostly female, half had a minimum of a high school education, 37% married, 34% widowed, 35% were alone. Sixty-seven percent met the definition of frailty. Half were functionally impaired, 22% fell one or more times, 12% were incontinent a minimum of 6 days in the past year, 40% had symptoms of depression a month prior to the study; 39% met two criteria for frailty, 13% met all three criteria; and 3% all four criteria for frailty. Participants who were older, female, took four or more medications, had a minimum of three chronic illnesses were most likely frail, less likely to feel close to their family, and slightly more likely to seek assistance from the church.

Limitations: No direct measures of family support, but did measure predictors of family support, cross-sectional design, so unable to establish causation on a one-time assessment, small sample size, nonrandom sampling, nonexperimental design, no control or comparison group, cannot generalize the findings in this urban, better-educated group to a different group of African Americans.

Boyd, R., & Stevens, J. A. (2009). Falls and fear of falling: Burden, beliefs and behaviors. *Age and Ageing, 38*(4), 423-428.

Overview: Falls are major cause of injury and death in U.S. among elderly. Falls are associated with fear and fear limits activity, increases deconditioning, and increases risk of future falls and fractures.

Sample/Ethnicity/Age: N = 1,709; males = 742, females = 967; majority age 65-69; no race indicated, English- or Spanish-speaking; 61.2% married, 36.2% moderately/ very afraid; 71.7% believe physical activity important in fall prevention; 58.1% had a review of medications this past year. Education > high school = 81.1%; income >$35,000 = 46%.

Source: Secondary data analysis using ICARIS-2, a cross-sectional, list-assisted, random digit phone survey.

Variables/Tools: Dependent variables include fear of falling (4 questions): How important is physical activity in prevention of falls? Has an MD or pharmacist reviewed medications in the past year? Have you fallen in the past 3 months? Those who fell reported changes in activity, medications, and/or environment. Independent variables included gender, income, education, marital status, age group.

Findings: Women were moderately or very afraid (43.2% vs 26.4%)' aged >75 (41.3% vs 33.3%) compared to 65-74 year age group; lower-income and single people. Oldest age group more likely to have fear of falls; fear of falls and history of a past fall significantly associated. Of the fallers, 49.6% were injured, 51.8% sought medical help for injury. No association with fear of falling and seeking medical help for injury. Few of those falling made preventive changes in activity, medications or environment.

Limitations: No definition of falls, fear of falls, injury; no tool for assessment of fear of falling; no reliability/validity of questions; people with landline phones included only.

Boyle, P. A., Buchman, A. S., Wilson, R. S., Leurgans, S. E., & Bennett, D. A. (2010). Physical frailty is associated with incident mild cognitive impairment in community-based older persons. *Journal of the American Geriatrics Society, 58*, 248-255.

Aim: To examine the relationship between mild cognitive impairment (MCI) and frailty.

Source: A prospective, observational, cohort study.

Sample: N = 761 elderly males and females; females = 76.4% from the Rush Memory and Aging Project. The participants were from 40 metropolitan Chicago retirement communities, residences, and subsidized housing facilities.

Ethnicity: Non-Hispanic Whites = 89.1%; Whites = 680; Hispanics = 28; African Americans = 46; Native Americans = 3; Asian Americans = 4.

Measures: Mini-Mental State Exam scores; global cognitive function and cognitive domains. Episodic memory: immediate and delayed recall of story A from Logical Memory, immediate and delayed recall of the East Boston Story, Word List Memory, Word List Recall, Word List Recognition. Semantic memory: 15-item Boston Naming Test, Verbal Fluency, 15-item reading test. Working memory: Digit Span Forward, Digit Span Backward, and Digit Ordering. Perceptual speed: Symbol Digit Modalities Test, Number Comparison, 2 indices from the modified Stroop

Neuropsychological Screening Test. Visuospatial abilities: 15-item Judgment of Line Orientation, 16-item Standard Progressive Matrices. Diagnostic classification: Complex Ideational Material. Clinical diagnoses: medical history, neurological exam, cognitive performance testing. Frailty: grip strength (dynamometer); gait (timed 8 foot walk); body composition (BMI); depression (2 questions from the modified Center for Epidemiological Studies Scale). Other measures factored: age, sex, race, education, disability (Katz index, instrumental ADLs from the Duke Older Americans Resources Services project).

Findings: Women were more frail than men (t (759) = 12.22, $p < .001$); frailty was negatively correlated to education ($r = -0.23$, $p < .001$) and global cognitive function ($r = -0.25$, $p < .001$). Frailty was correlated to age ($r = 0.33$, $p < .001$).

Limitations: Short study follow-up; exclusion of the cognitively impaired; participants required to donate their organs at the time of their death as a criteria for inclusion into the study; selective bias.

Brownson, R. C., Eyler, A. A., King, A. C., Brown, D. R., Shyu, Y. L., & Sallis, J. F. (2000). Patterns and correlates of physical activity among US women 40 years and older. *American Journal of Public Health, 90*, 264-270.

Aims: To examine patterns of physical activity and examine sociodemographic and behavioral correlates in a population of minority women over age 40 and compare them to White women over age 40. Physical activity is defined, giving six criteria of physical activity.

Source: A cross-sectional telephone survey from July 1996 to June 1997.

Sample: N = 2,912.

Ethnicity: Using zip codes with more than 20% of the following ethnic groups: African American, American Indian/Alaska Native, Asian American/Pacific Islander, and Hispanic. For White women aged 40 and over, standard Behavioral Risk Factor Surveillance System (BRFSS) random digit dialing of telephone numbers was used.

Measures: A 92-question survey with a mean administration time of 29 that assessed leisure physical activity, occupational activity, and activities around the house.

Findings: Physical activity was lowest for African Americans/American Indians/Alaska Natives (OR = 1.35; 95% CI, 1.08, 1.68 and OR = 1.65; 95% CI, 1.33, 2.06), who were more likely to be classified as completely inactive when compared to /Whites. When physical activity was based on occupational activities, a higher proportion of women were classified as physically active. Using a composite definition of physical activity, nearly three-quarters of respondents reported physical activity.

Limitations: Self-reports via telephone survey was the only source of information; English-speaking minorities may have been overrepresented; instrument was not

extensively used among these subgroups and may not have been examined for cultural competence.

Cahall, M., Jerome, R. N., & Powers, J. (2008). The impact of a literature consult service on geriatric clinical care and training in falls prevention. *Journal of the Medical Library Association, 96*(2), 88-100.

Annotation: Participant characteristics: none. This is not a study but a guide on how to conduct a literature search that is thorough, nonbiased, focused on quality/strength of studies, and setting variation of findings based on the culture being studied.

Carroll, N. V., Slattum, P. W., & Cox, F. M. (2005). The cost of falls among the community-dwelling elderly. *Journal of Managed Care Pharmacy: JMCP*, *11*, 307-316.

Aims: To estimate direct medical cost of falling in community-dwelling elderly.

Source: A secondary data analysis using Medical Expenditure Panel Survey (MEPS) with two of the four surveys.

Sample: N = 4,025 community-dwelling elderly age >65.

Ethnicity: Hispanics, African Americans, and Whites.

Measures: Total healthcare expenses; demographics (age, gender, education, race/ethnicity, marital status, income, and region of the country where participants resided).

Findings: Total direct medical cost for fall-related care in 1997 was $6.2 billion, with a mean cost/faller of $2,039 and a mean cost per patient receiving fall-related care was $2,566. Adjusted to 2002, the total direct fall-related cost for care was $7.8 billion, with a mean cost/faller $2,591 and mean cost per patient receiving fall-related care $3,261. Inpatient hospitalization was responsible for 64.6% of fall-related medical care in community-dwelling elderly in 1997. The majority of respondents were: White (fallers 83%, non-fallers 74.5%), age 65-74 (fallers 37.6$, non-fallers 55.4%), female (fallers 69.7%, non-fallers 59.3%), and residents of the South (fallers 29.2%, non-fallers 35.3%).

Limitations: Reliance on self-report and recall.

CDC. (2008). *Traumatic brain injuries can result from senior falls.* Retrieved 10/21, 2009, from http://www.cdc.gov/ncipc/tbi/elder_fall.html

Source: This is a government press release describing the number of deaths and hospitalizations from traumatic brain injuries (TBIs) related to falls.

Sample: Used data from 2005 National Center for Health Statistics Systems and the Agency for Healthcare Research and Quality’s National Inpatient Sample.

Findings: Males had higher death rates from TBIs than females (26.9/100,000 compared to 17.8/100,000). Hospitalization rates for TBIs related to falls were similar (143.3/100,000 compared to 158.3/100,000). Death and hospitalization rates for TBIs related to falls increased as age increased. Average length of hospitalization for fall-related TBIs was 2-6 days; median charges for men were $19,191 and for women $16,006.

Usefulness to My Study: This information shows that injuries from falls are not limited to fractures and gives a further reason why preventive measures need to be taken on the part of family, professional practitioners, and patients to prevent them, especially as the aging population increases.

Limitations: There is no breakdown on how each age and ethnic group is affected; the study used inpatient population and did not reflect populations that are survivors in need of long-term care.

CDC—Falls among older adults: An overview. (2010). Retrieved June 1, from http://www.cdc.gov/HomeandRecreationalSafety/Falls/adultfalls.html

Source: This is a fact sheet put out by the CDC.

Age: All elderly people defined as age 65 and older.

Usefulness to My Study: Explains the scope of the problem (falls in elderly) in terms of financial consequences, some statistics on those who fall, preventive strategies, who is at risk, and what actions are being taken by the CDC to reduce the problem.

Centers for Disease Control and Prevention. (2012). *Falls among older adults: An overview.* Retrieved June 15, 2012, from http://www.cdc.gov.homeand recreationalsafety/falls/adultfalls.html

Aims: To educate the practitioner and the public about falls among persons in the U.S. age >65, consequences, direct and indirect costs, and to identify who is at greatest risk.

Source: A fact sheet from a government website.

Sample: N/A.

Ethnicity: Directed to the general population.

Measures: N/A.

Findings: One in three elders age >65 falls, making falls the leading cause of death from injury among those age >65. In 2007, over 18,000 died from unintended fall injuries. In 2009, 2.2 million nonfatal injuries from falls resulted in emergency department visits; over 581,000 were hospitalized. Risk factors included advancing age (in 2009 rate of injuries secondary to falls in age >85 was almost 4x that of adults aged 65-74) ; gender (in 2007, adjusting for age, fall fatality rate was 46% higher for men vs. women; women were more likely to be injured with 46% more likely to suffer a nonfatal injury in 2008; the fall rate in older women was over 2x that of males; hip fracture rates among women were almost double the rate for men); Whites (2.5x more likely to die vs. Blacks); White women with significantly higher hip fracture rates compared to Black women; older non-Hispanics have higher fatal fall rate than Hispanics. Outcomes: 20-30% suffer moderate to severe injuries. In 2000, traumatic brain injuries resulted in 46% of fatal falls; fractures of the hip, spine, forearm, ankle, pelvis, upper arm, pelvis; fear of falling even if no injury resulted (limits activity levels, mobility and physical fitness resulting in decreased abilities and increased fall risk). Costs: direct costs more than $19 billion, with $179 million spent on fatal falls and 19 billion on injuries from nonfatal falls in 2000. By the year 2020, indirect and direct costs from injuries secondary to falls are expected to reach $54.9 billion (in 2007 dollars). Among community-dwelling elderly, the expenditure breakdown for fall-related injuries was: 65% inpatient hospitalization, 10% medical office visits, 10% home health care, 8% hospital outpatient visits, 7% emergency department visits, 1% dental and 1% prescription drugs, with 78% Medicare reimbursed. Indirect costs include: lost productivity, dependence on others, decreased quality of life.

Limitations: Readers must take into consideration the original source(s) of data, validation of findings, methods, and funding of the original study.

Charlson, M. E., Pompei, P., Ales, K. L., & MacKenzie, C. R. (1987). A new method of classifying prognostic comorbidity in longitudinal studies: Development and validation. *Journal of Chronic Diseases, 40*, 373-383.

Aims: To develop an instrument that may be capable of predicting short-term mortality for use in longitudinal studies; comparing the instrument to the Kaplan and Feinstein instrument.

Source: A longitudinal study.

Sample: For the training population N = 604 medical service patients from New York Hospital-Cornell Medical Center for 1 month in 1984, with 559 available for 1-year follow-up. For the testing population, N = 685 patients with breast cancer admitted between January 1, 1962-December 31, 1969 to Yale New Haven Hospital.

Ethnicity: Not addressed.

Measures: In the training population, severity of the illness at admission, demographic and clinical characteristics, and course and at 1-year follow-up survival. In the testing population, stage, nodal status, history, menstrual status, symptom status, disease progression, number and severity of comorbid diseases were assessed.

Findings: One-year mortality rates according to the number of comorbidities were as follows: 0 = 12% or 181, 1-2 = 26% or 225, 3-4 = 52% or 71, and >5 = 85% or 82. The 10-year cumulative survival rates according to the weighted comorbidities was 0 = 8% of 588, 1 = 25% or 54, 2 = 48% or 25, >3 = 59% or 18. Both the Kaplan-Feinstein instrument and the Charlson instrument were able to identify those at very low risk of comorbid death. Kaplan-Feinstein ranks from 0-3 on the single worst condition while the Charlson instrument assigns a weighted score from 1-6 for each comorbid disease. The Kaplan-Feinstein instrument was a significant predictor of death from comorbidity as was age for both instruments. The variance when comparing the survival curves of the Kaplan-Feinstein instrument to the Charlson instrument showed almost identical variance using both methods.

Limitations: May require patients to be stratified in so many groups and that may not be possible.

Chen, F. M., Fryer, G. E., Phillips, R. L., Wilson, E., & Pathman, D. E. (2005). Patients' beliefs about racism, preferences for physician race, and satisfaction with care. *Annals of Family Medicine, 3*, 138-143.

Aim: To examine the relationship between patients' beliefs on racism and their healthcare experiences.

Source: A secondary data analysis of a telephone survey.

Sample: N = 3,884 males and females from Kaiser Family Foundation Survey of Perceptions and Experiences.

Ethnicity: Whites = 1,479; African Americans (AAs) = 1,189; Latinos = 983.

Measures: Preferences, beliefs, and satisfaction. Preferences: single question—If you had to choose, would you prefer treatment by a provider of your own race? Satisfaction: using the letters A-F to grade with A = excellent and F = failing, how satisfied are they with that physician? Beliefs: 9-item instrument (the Discriminatory Belief Scale) measures patients' beliefs on racism in the healthcare system.

Findings: Twenty-two percent of AAs preferred an AA physician, 65% of AAs had no preference. AAs had stronger beliefs about racism than Latinos (12.4 vs. 11, $p < .001$); AAs with a preference for an AA physician had stronger beliefs about racial discrimination than those with no preference (14.4 vs. 11.8, $p < .001$). Thirty-nine percent of AAs who wanted an AA physician got one, 27% of AA without a preference had an AA physician. Latinos preferring a Latino physician were more likely to have one (47% vs. 31%, $p = .005$). AAs who wanted and got an AA physician were 3x more likely to rate their MD as excellent vs. AA with a non-AA physician (57% vs. 20%, $p < .001$). Latinos who wanted and got a Latino physician rated them as excellent vs. Latinos who preferred but did not get a Latino physician (40% vs. 29%, p = NS). Fifty-four percent of Whites who preferred and got a White physician rated them as excellent.

Limitations: No temporal relationship, only associations due to the nature of the study; no data on nonresponders (49% response rate); minorities may feel pressure to give minority providers higher ratings.

Cho, H., Stout, S. D., & Bishop, T. A. (2006). Cortical bone remodeling rates in a sample of African American and European American descent groups from the American Midwest: comparisons of age and sex in ribs. *American Journal of Physical Anthropology, 130*, 214-226.

Aims: To answer the following questions: Do differences in age-related patterns of bone remodeling rates and bone mass exist between African Americans and European Americans? Are there population differences in osteopenia risk and fracture risk? Are variations in remodeling based on gender?

Source: An empirical study; correlational study comparing bone structure between the races.

Sample: N = 199; males: N = 117; females: N = 74; unknown were 8.

Ethnicity: African Americans = 135; European Americans = 64.

Measures: Rib samples of the sixth rib of African Americans from Washington Park cemetery, St. Louis, Missouri were taken. Samples were from 17-95 years of age, mean 54.3. The European American samples were from autopsied ribs used by Stout/Paine in their 1992 study, using the methodologies they used; 29 of the samples were from cadavers, autopsy cases, and forensic cases, for a total of 64 ranging in age from 17-102, with a mean age of 43.8.

Findings: All groups had statistically significant slopes with age in absolute cortical area except European American males. The most significant difference was between African American females and European American males: the European American males had highest OPD (higher activation of remodeling foci and bone turnover) at a younger age, compared to African American females who had a small OPD (lower porosity, increased bone quality) at a younger age. Meaning: African American females have greater bone mass at a younger age than all others at the same age; however, this pattern reversed itself at the seventh decade. European American males demonstrated relatively no bone mass change with age while other groups lost mass with increased age.

Limitations: It is important to consider lifestyle and genetics in future studies. African Americans are a mixt of European, Native American, and African heritage. There may be a difference between African Blacks and African American Blacks as well as non-African Blacks. Those who are more physically active may have different fragility and fracture rates than those who are less physically active. There was no way to know the physical activity level of the people whose bone samples were used in this study. In this study, there was a smaller European sample; the sample site may show differing dynamics and therefore different results than if other sample sites were used; lifestyle was not taken into account as a variable possibly affecting bone structures.

Clemson, L., Cumming, R. G., & Heard, R. (2003). The development of an assessment to evaluate behavioral factors associated with falling. *American Journal of Occupational Therapy, 57,* 380-388.

Aims: To develop a valid/reliable instrument to evaluate daily behaviors that protect elderly from falls.

Source: Instrument development study.

Sample: N = 550 community-dwelling elderly age >65, nursing home residents excluded. Participants 65-98 years, mean 76.8 years. Females N = 321 or 77%; lived in a single-family dwelling and left the house more than once weekly.

Ethnicity: Majority Australian-born (N = 339 or 81%), 47 or 11.3% Britain/Ireland; English-speaking (N = 706 or 97%).

Measures: Falls Behavioral Scale (FaB), consisting of 45 multiple-choice items; demographics (age, gender, cultural-ethnic background assessed with country of birth and language spoken at home, type of dwelling); falls in the past year (how many times); number of times leaving the home in the past month; physical functioning (SF-36 health survey).

Findings: 76% response rate with 422 scales and surveys returned, 4 eliminated due to incomplete data. Eighty-two percent were independent in bathing/dressing; over 50% not limited in ascending stairs, walking half a kilometer; 34% had one or more falls/year, with findings similar for males and females. The FaB Scale reduced to 30 items and 10 factors. Content validity on 30 items was 0.93. Reliability observed with a Cronbach's alpha of 0.84; test-retest reliability was 0.94 ($p < 0.01$ with an average of 16.25 days between test and retest). Positive association with increased age and scores on most dimensions. Negative correlations between SF-36 scores and FaB dimensions. Females used safer behaviors than males; however, the association was not a strong one.

Limitations: Personal perception of their own behaviors requires elderly to be realistic, accepting of limitations.

Clemson, L., Cumming, R. G., Kendig, H., Swann, M., Heard, R., & Taylor, K. (2004). The effectiveness of a community-based program for reducing the incidence of falls in the elderly: A randomized trial. *The American Geriatrics Society, 52*, 1487-1494.

Aim: To test the effects of a community-based exercise program in fall reduction among a sample of community-dwelling people at high risk.

Source: A randomized trial, two-group trial called Stepping On, lasting 7 weeks that included 15.5 hours of intervention in seven 2-hour sessions and 1 home visit. Intervention participants had a booster session 3 months after the seventh session that was 1.5 hours long at the program venue. The control group received two social visits from an occupational therapy student during the same time as the intervention program. No discussion of falls or fall prevention was done.

Sample: 310 men and women age >70 recruited from advertisement, database mailings, referrals, veterans affairs. Control group n = 135, with females n = 113 or 74%. Program group n = 157, with females n = 117 or 74%. Participants were from Sydney, Australia.

Ethnicity: Race not discussed in this study.

Measures: The outcome variable was fall occurrence using self-report from baseline to 14 months post-randomization. Baseline assessments were demographics, health history, functional measures of mobility and balance (Get Up and Go Test and the Rhomberg test); perceptions of health across mental and physical domains (36-Item Short Form of SF-36); confidence to avoid falls in basic activities of daily living (MFES); beliefs of abilities during postural challenges with the Mobility Efficacy Scale (MES); physical activity with the Physical Activity Scale for the Elderly (PASE).

Findings: Falls were reduced in the intervention group (RR = 0.69). Program participants used greater protective behaviors compared to control participants (FaB, p = .024); program participants were able to maintain confidence in ability to perform activities of daily living (ADLs) more so than the control group (p = .042). The intervention was more beneficial for men n = 80, RR = 0.32, CI = 0.17-0.59.

Limitations: Findings may not be applicable to other groups unlike the sample.

Connell, B. R., & Wolf, S. L. (1997). Environmental and behavioral circumstances associated with falls at home among healthy elderly individuals. Atlanta FICSIT Group. *Archives of Physical Medicine and Rehabilitation*, *78*(2), 179-186.

Aims: To examine the behavioral, personal, and environmental factors associated with falls and near falls using reenactment to understand events.

Source: A 13-month observational study.

Sample: N = 15 participants of the Atlanta Frailty and Injuries Cooperative Studies of Intervention Techniques (FICSIT) study; elderly age 70-81years; primarily having arthritis (87%) but independent and in good health who were independent in using a phone, money management, and medication self-administration.

Ethnicity: Not specified.

Measures: Falls and near falls (location and number); circumstances of falls and near falls (location, precipitating factors using a trained interviewer and an accident reconstruction technique).

Findings: Fifty-two falls and near falls by 39 people in the study, with 15 out of 39 people reporting 19 incidents. The 15 participants in the study provided the data for this study. Eighteen incidents of the 19 were reenacted; one of the participants had poor recall. Seven patterns of behavior and environment were noted: collisions in the dark (3); falling to avoid temporary hazards (2); preoccupation with temporary conditions (2); frictional variations with foot contact (2); excessive environmental demands (7); habitual environmental use (1); inappropriate environmental use (2).

Limitations: The use of generally healthy individuals for the study; participants may have capitalized on the use of environment to prevent falls by using furniture or anything present in the environment to prevent falls.

Cook, C., & Shroyer, J. (2002). Vigorous physical activity and fall occurrence. *Physical and Occupational Therapy in Geriatrics*, *21*(1), 1-19.

Overview: A third of the elderly community residents age >65 will fall, which can lead to a fracture in a tenth of cases. No single cause, multiple causes but physical activity and exercise are associated with decreased falls. Physical activity: benefits are many but participation increases risk of falling. Literature lacks a consistent definition of physical activity which can include everything from household chores, walking on up to vigorous sports. Definition of vigorous physical activity (VFA) given by HRS is "sports, physical labor, or heavy housework performed consistently 3x/wk." More precise definition of exercise includes gait and resistance training. Resistance exercise and gait training has decreased falls 20-40%, with benefits (falls) decreasing up to 6 months. Type, duration, intensity, frequency of exercise are inconsistent/unknown in studies. Need for studies using tools validated for use in elderly.

Source: Empirical study; correlational study using a secondary data analysis.

Questions: (Four) Is voluntary vigorous physical activity (VPA) as defined by HRS associated with a decrease in falls in a generalizable sample of older Americans? Is VPA associated with a decrease in falls in a generalizable sample of older Americans? Is VPA associated with a decrease in serious injury and propensity for hip fracture in a generalizable sample of older Americans? Is VPA associated with the incidence of hip fracture?

Variables: Dependent variables are falls, falls with serious injury, broken hip, falls frequency. Independent variables are age, VFA, marital status, monthly expenditure, gender, and race. Data collected in 1998 with trained administrators via phone survey of the same people every 2 years in 6-month increments. Since this is cross-sectional, these data represented a 6-month time period.

Sample: N = 11,226 elderly age 65-106 years, 57% female, 84% White, 13% African American, 6% Hispanic, and less than 4% other. Data from the HRS (Health and Retirement Study), secondary data analysis.

Statistics: Logistic regression using SAS, version 8.2; Tobit linear regression.

Cooper, L. A., Beach, M. C., Johnson, R. L., & Inui, T. S. (2006). Delving below the surface: Understanding how race and ethnicity influence relationships in health care. *Journal of General Internal Medicine, 21*, S21-S27.

Aims: To examine the role race/ethnicity plays in healthcare relationships; to explore social/historical context of race/ethnicity in healthcare.

Source: A narrative literature review.

Sample: N/A, not a study.

Ethnicity: African Americans/Blacks, Hispanics, Asians.

Measures: N/A.

Findings: Extensive literature on health disparities but focus on technical aspect, not quality of interpersonal relationships. Physicians in dealings with African American patients were less empathetic, showed less courtesy, were less willing to share information, were verbally dominating and less conversational, and spent less time answering questions compared to Whites. Hispanics/Asians: data on communication limited to concerns about language barriers and physical attentiveness. Minority patients were less likely to feel partnership (shared decision making) with health providers. In terms of respect, African Americans and Hispanics more likely to feel disrespected; Asians most likely to feel looked down upon. African Americans, Asians, and Hispanics felt they would get better care if they were a different race. If patients felt their physician knew them as a person, they were likely to receive better care and less likely to be stereotyped. Affiliation: physicians were less likely to rate Black vs. White patients as individuals they could see themselves as friends with. Trust: linked to satisfaction, adherence, continuity of care, use of preventive services. Minorities have less trust in doctors, research, and the system in general. Racial/ethnic concordance: shared identities; can be visible (age, race, gender, social class) or invisible (beliefs, attitudes, values, preferences, role orientations). Racial/ethnic concordance is associated with partnership, respect, patient satisfaction, longer visits, and positive patient effects. Minorities were more likely to care for their own, work among the underserved, poor, inner city. Minority providers can face discrimination in practice, difficulty providing high quality of care. Increasing providers' awareness improved interview skills and allowed them to switch focus to their patients and provide care with greater empathy.

Limitations: Methodology of obtaining articles for review not addressed.

Corby-Smith, G., Thomas, S. B., Williams, M. V., & Moody-Ayers, S. (1999). Attitudes and beliefs of African Americans toward participation in medical research. *Journal of General Internal Medicine, 14*, 537-546.

Aims: To examine some of the barriers to participation in research studies proposed by African Americans.

Source: An exploratory study utilizing five guided discussions.

Sample: A focus group utilizing African American outpatients at an urban public hospital. N = 33, females = 23, males = 10. Potential participants approached by research assistant.

Ethnicity: All African Americans.

Measures: A brief introduction and warm-up, collection of informed consent followed by guided questions on the following pathway: general questions of the state of their own health, perceptions of medical care, providers of that care and of research; how does care differ from medical research; general idea of why they may or may not participate in research; were they aware of the Tuskegee Syphilis Study? What have they heard about other studies? Were they aware of the protections for participants in medical research? What can researchers do to increase participation of African Americans in research?

Findings: Participants knew of the Tuskegee study, but few knew the specific details of the study. Reasons for nonparticipation included anger at being used as “a guinea pig” by researchers; fear of injections and of being injected with some kind of virus; lack of a need in light of personal good health; questions about whether any benefits would come to their own race; fear of losing control once they signed over consent; lack of trust of the medical profession; fear of conspiracy with the legal profession since African Americans in general did not have money to seek restitution for wrongs; motives of researchers were fame, money, and power. Better communications needed between African Americans and medical research community to increase information and trust so African Americans can better understand the process and expectations, especially the risks.

Limitations: Very small study; this qualitative study was conducted to see what needs to be studied possibly in the future; study done at one site and findings may reflect people only in that site or area.

Cree, B. A., Khan, O., Bourdette, D., Goodin, D. S., Cohen, J. A., Marrie, R. A., Glidden, D., Weinstock-Guttman, B., Reich, D., Patterson, N., Haines, J. L., Pericak-Vance, M., DeLoa, C., Oksenberg, J. R., & Hauser, S. L. (2004). Clinical characteristics of African Americans vs. Caucasian Americans with multiple sclerosis. *Neurology, 63*, 2039-2045.

Aims: To compare the clinical characteristics of multiple sclerosis between African Americans and Caucasian Americans.

Source: A retrospective cohort study.

Sample: N = 802, with 81% women in African American and 77% women in Caucasian American population.

Ethnicity: African Americans N = 375, Caucasian Americans N = 427.

Measures: Stages or categories of the illness (relapsing remitting, secondary progressive, primary progressive, and progressive relapsing).

Findings: Increased tissue damage from lesions, more severe phenotype of the disease in African Americans despite earlier age of diagnosis, shorter disease duration and no significant difference in length of treatment. Worse disease course for African Americans despite the disease being more common in people of northern European descent. Earlier diagnosis in African Americans due to increased involvement of spinal cord, optic nerve, and cognitive involvement. African Americans more likely to become disabled.

Limitations: Study is retrospective; cannot control for environmental factors such as diet, tobacco use, use of multivitamins.

Cwikel, J. G., Fried, A. V., Biderman, A., & Galinsky, D. (1998). Validation of the fall-risk screening test, the Elderly Fall Screening Test (EFST), for community-dwelling elderly. *Disability and Rehabilitation, 20,* 161-167.

Aims: To validate the Elderly Falls Screening Test (EFST) in a sample of community-dwelling elderly.

Source: A validation study using the instrument to differentiate elderly into high- or low-risk groups using a single-blind technique.

Sample: Community-dwelling elderly age >60, independent (not home-bound or bed-bound) who were able to partake in the interview. N = 568 eligible with 361 available for in-home interviews. Mean age 71.5 years with age up to 80.

Ethnicity: Conducted using participants from Israelis General Sick Fund in catchment areas of a primary care clinic.

Measures: Demographics; functional/activity levels; self-rated health/conditions; depression (Geriatric Depression Scale, short version); Brookdale Cognitive Screening Test (BCST); extra-laboratory assessment method (ELGAM); Elderly Falls Screening Test (EFST). The EFST is a 5-question assessment; the first three questions involve a self-report and the remaining two questions involve the assessor to evaluate themselves. Scores range from 0 (low risk) to 5 (high risk), with each yes answer equaling 1 point. Those identified at high risk were referred to physicians for physical assessment; these physicians were blind to results of initial assessment. Concurrent and predictive validity were assessed during this study.

Findings: Test-retest reliability over 1 year was approximately.40 for falls ($p < .01$, two-tailed) and .28 for near falls. Of the 28 persons referred for medical assessments, results showed the EFST and medical assessment agreement as follows: physical exam agreement and EFST, 75%; positive predictive value of EFST (the probability of having medical problems that may be associated with high scores on EFST), 66.7%. Specificity (proportion of people with no fall-related medical problems identified by EFST as being low-risk) was 69%. Sensitivity or the ability of EFST to identify those with medical problems as high risk) was 83%.

Limitations: Small study population; sample did not include the oldest of the old population.

Daley, M. J., & Spinks, W. L. (2000). Exercise, mobility and aging. *Sports Medicine (Auckland, N.Z.), 29*, 1-12.

Aim: To show age-related changes in the body and their effect on mobility and falls.

Source: Clinical journal article.

Sample: Elderly population in the United States.

Ethnicity: Not specified.

Measures: None.

Findings: Benefits of exercise on elderly: decreased fatigue for ADLs, quicker recovery after illness, increased energy for leisure/pleasure. Effects of no exercise: low work capacity, loss of strength/bone. Physical changes associated with aging include loss of height (ages 65-74 are 3% shorter than those aged 18-24); weight (elderly females are 11% heavier than younger, males lighter than younger males); cardiovascular: increased ventricular, aortic, arterial tree thickness, decreased vessel circumference, postural hypotension. Respiratory: decreased cilia, lung capacity (by 50%), increased residual volume (30-50%). Immune system: increase in malignancies, infectious diseases, decreased glucose tolerance. Central and peripheral nervous system: decreased brain weight and blood flow, slower reaction times (slowed sensory-motor coordination), cortical atrophy. Senses: among elderly cataracts, glaucoma, macular degeneration, diabetic retinopathy, hearing losses with vestibular losses resulting in balance problems. Between ages 30-80 muscle strength and mass, especially type 2 muscle fibers decrease, particularly in women and ages 50-60. Losses of calcium increased risk of fractures and decreased flexibility and range of motion. Balance time for age <30 = 22 seconds, age >70 = 13 seconds and less. Decreased perception of vibration at ankle joints (loss of posture, balance, and gait); slower gait speeds vs. younger adults (118-145 cm/second vs. 143-160 cm/s), shorter stride length (135-153 cm vs. 151-170 cm); hip flexion and ankle dorsiflexion increases while ankle plantar flexion decreases. Factors increasing fall risk include cognitive/visual deficits, musculoskeletal defects, fear of falling, certain medications, gait/balance deficits, environmental factors. Exercise decreases incidence of: hypertension, hyperlipidemia, diabetes mellitus, coronary heart disease, obesity and osteoporosis; increases coordination, strength and muscle mass, endurance, gait, and fitness.

Limitations: More research needed on effects of exercise on mobility.

de Rekeneire, N., Visser, M., Peila, R., Nevitt, M. C., Cauley, J. A., Tylavsky, F. A., Simonsick, E. M., & Harris, T. B. (2003). Is a fall just a fall: Correlates of falling in healthy older persons. The Health, Aging and Body Composition Study. *Journal of the American Geriatrics Society, 51*(6), 841-846.

Ov**erview:** Falls affect a third of elders residing in the community aged 65 and older yearly. This percentage increases to 50% by age 80; falls are responsible for 87% of fractures and injuries and 5.3% of hospitalizations in elderly, with 60% of fall-related deaths in 1996 due to falls in people over the age of 75. There are many physical as well as psychological costs to elders who fall. Factors associated with falls: being female, chronic diseases, polypharmacy, disabilities, frailty. Researchers assert that falls in healthier people can and do occur; the risk factors in this group are not researched as well as risk factors in the frail group and this group may be more at risk than they appear.

Source: A correlational study; a cross-sectional analysis using data from the Health ABC study.

Aims: To identify in healthy elderly persons risk factors associated with falling that may put them at risk.

Sample, Ethnicity, and Age: N = 3,075 Black and White elderly men and women ages 70-79 who were enrolled in the Health ABC Study, a longitudinal, prospective study of relationships among health conditions, body composition, social/behavioral factors, and functional decline. A random sample of all age-eligible Blacks in a particular zip code and White Medicare recipients were included. Excluded: anyone having difficulty walking a quarter mile, 10 steps without resting, or performing BADLs; using a cane or assistive device, people with certain terminal cancers, persons planning to move within 3 years. This study was a cross-sectional design.

Variables/Measurements: Number of falls in the past year (self-report); self-reported health status (diseases, medications, eyesight, urinary continence); MMSE, Digit Symbol Substitution, CES-D (depression scale); physical activity/ability: ease or difficulty performing activities and whether they have participated in any exercise at least 10 times; lower extremity performance (timed chair stands), leg muscle isokinetic strength (Kin-Com 125 AP Dynanometer); balance (semi-tandem, tandem and one-leg stands) and narrow walk test; long distance walk using the 2-minute walk and 400 meter walk (stopped participants for heart rate >135 or <40, chest pain, shortness of breath, dizziness, faintness); BMI and total leg muscle mass via DEXA scanning.

Statistical Analysis: SAS; males compared to females, fallers compared to non-fallers; Chi-squared for dichotomous variables; generalized linear models for continuous models; multivariate logistic regression for combinations of risk factors associated with falling. Sensitivity analysis used for missing data entered conservatively, but no variables entered the models.

Findings: Seventy percent reported one fall, 21% fell in the past year, with White women having the greatest percentage of falls; fallers had more chronic illnesses and were on more medications, had greater difficulty walking and carrying 10 pounds; fallers had poorer functional status as measured by leg strength, standing and walking balance, timed 400-meter walks, total and leg muscle mass. For men: White race, urinary incontinence, lower semi-tandem and tandem score, slower 6-meter walk time, and inability to perform five chair stands was associated with falls. Women: benzodiazepines, inability to perform chair stands was associated with falling. Variables affecting both sexes/commonly associated with falling: urinary incontinence, difficulty rising from a chair. The authors were unable to observe factors identifying those at risk from among a group of higher-functioning elderly. This may suggest that some subclinical deficits may go unnoticed by clinicians in the nonfrail elderly population. No single medical condition associated with falling, but decreased functional status seemed to be a predictor. Higher rates of falling, especially in White women, are consistent with previous research.

Limitations: There may have been underreporting of falls; there may not have been sufficient power to observe those who have fallen more than once; missing values for some functional measures (authors used sensitivity analysis to account for this and found no association); measurements were taken after a fall and could have been influenced by the fall. Well-functioning elderly was not clearly defined. Needs further research on identifying those at risk within a group of high-functioning nonfrail elderly.

Delbaere, K., Crombez, G., Vanderstraeten, G., Willems, T., & Cameron, D. (2004). Fear-related avoidance of activities, falls and physical frailty: A prospective, community-based cohort study. *Age and Ageing, 33*, 368-373.

Aim: To examine relationships among fear-related activity avoidance, falls and frailty.

Source: A two-part study: Part 1 is a cross-sectional study of activity avoidance due to fear of falling related to frailty and physical function; part 2 is a longitudinal study of fear-related activity avoidance as a risk factor for falls with a 1-year follow-up.

Sample: N = 225 community-dwelling elderly age >60 without muscular-skeletal problems, acute/terminal illness or severe central nervous system involvement.

Ethnicity: Not specified.

Measures: Pharmaceutical use; cardiovascular or other complaints; body mass index (BMI); fall history (past via y/no, 1-year follow-up via fall calendar); avoidance of activity (Dutch version of Survey of Activities and Fear of Falling in the Elderly); physical frailty (Physical Performance Test); postural control (Basic Balance Meter System to measure center of pressure, gravity; the Modified Clinical Test of Sensory Interaction on Balance; 100% Limits of Stability); muscle performance (hand-held dynamometer).

Findings: Frequent fallers (fell in the past and during 1-year follow up) were female, on more medications, frailer, avoided activities more vs. non-fallers. Cross-sectional findings: correlations with total SAFFE scores and falls in the past (r = 0.33, $p <$ .001), general physical frailty (r = -0.49, p < .001); knee extensors (r = -.44, p < 0.001); knee flexors (r = -.34, $p < .001$); hand grip strength (r = -.37, $p < .001$); FCOP (r = -.31, $p < .001$); functional reach (r = -.36, $p < .001$); timed chair stands (r = -.41, $p < .001$). Longitudinal outcomes: SAFFE showed a positive correlation with fall incidence after follow-up (r = 0.30, $p < .001$). Classifying participants as fallers (n = 47 or 20.9%) and non-fallers (n = 107 or 47.6%), the 1-item fear of falling, ADL and mobility subscales were associated with falls. Fear (p < .001, OR 2.83, 95%, CI 1.78-4.52), avoidance of mobility (p < .001, OR 1.12, 95%, 1.05-1.20), old age ($p < .001$, OR 1.11, 95%, 1.05-1.18), female gender ($p < .001$, OR 3.86, 95%, CI 2.12-6.80) were predictors of falls in 1-year follow-up.

Limitations: Small sample size, those excluded were probably the most likely to fall, leaving the healthiest participants for the study; study design (correlational) limits ability to imply causation.

Dharmarajan, T. S., Avula, S., & Norkus, E. P. (2006). Anemia increases risk for falls in hospitalized older adults: An evaluation of falls in 362 hospitalized, ambulatory, long-term care, and community patients. *Journal of the American Medical Directors Association, 7*(5), 287-293.

Overview: Anemia is defined by WHO (World Health Organization) as hgb <12 in females, hgb <13 in males; adults between age 60-69 = 5-8% are anemic; 12-15% over age 69. African Americans highest anemia rates between age 60-69 (rates 15-20% and increases to 25% over age 69). Prevalence of anemia increasing in older women; anemia underrecognized and undertreated; risks poorly defined. Anemia linked to decreased physical performance, increased disability and risk factor for falling. Falls defined: sudden, unintentional loss of posture, result in person finding them coming to rest at a lower level nonforcefully.

Source: Observational, correlational study.

Sample: N = 362; aged 59-104, ambulatory, hospitalized patients from the community and nursing homes; study period 3 years from June 2000 to December 2004.

Aims: To observe the relationship between anemia and fall risk.

Methods: Examined incident reports, charts of patients identified as having a fall during hospitalization from June 2001 to December 2004.

Independent Variables: Demographics, medical comorbidities, fall history, lab values from the charts. Two groups: those who fell vs. control or those who did not.

Statistical Analysis: STATA; descriptive statistics; Student t-tests, one-way ANOVA (difference between means of two or three continuous variables); Chi-square (comparison of categorical variables); logistic regression analysis (significance of relationship between anemia and falls); multiple regression analysis (significance of relationship between hct, hgb, and falls); model testing: Is there an independent relationship between falls and age?; falls and hgb; the continuous variables; model testing: Is there an independent relationship between falls and gender, falls and residence, falls and race and falls and anemia?; categorical variables.

Findings: Patients who fell had anemia significantly more often than non-fallers (p = .001); falls and controls had similar frequencies of comorbidity (p = >.05); 198 patients (54.7%) fell during hospitalization. Fall patients had significantly lower mean hgb, lower mean hct, higher anemia prevalence, and higher length of stay than controls. Fall risk decreased by 22% for every 1g/dL increase in hgb above 6.8g/dL; risk of falls were significantly less for Hispanics compared to other races (OR = 0.45; CI: 0.25-0.79; p = .005). Anemics higher risk of falling vs. non-anemics (OR 1.86, 95% CI 1.16-2.82; p = .008). Age, place of residence, and gender were not related to fall risk.

Limitations: Patients were from the Bronx, population may not be generalizable, may lack diversity regarding geography; controls were matched from the same setting by age and gender; no controls for medications, sensory impairments, gait/balance; noninterventional study, so relationships were observed and not causation.

Dhesi, J. K., Jackson, S., Bearne, L. M., Moniz, C., Hurley, M. V., Swift, C. G., & Allain, T. J. (2004). Vitamin D supplementation improves neuromuscular function in older people who fall. *Age and Ageing, 33*(6), 589-595.

Overview: Vitamin D deficiency is common in the aged and contributes to fracture risk; supplementation was found in one study to decrease fracture risk in elders. Elderly with increased Vitamin D levels have fewer falls. Supplementation along with calcium in health elders decreases falls, with repeat fallers benefitting the most. Falls are defined as: unwillingly coming to a rest on the ground or lower level with or without losing consciousness and for reasons other than paralysis, seizure, excess alcohol intake, or external force. Vitamin D deficiency increases risk of fractures in advancing age.

Source and Aims: Randomized, double-blind, placebo-controlled study to examine effects of supplementation with Vitamin D neuromuscular factors associated with falls with fractures. Experimental, empirical study.

Sample and Ethnicity: N = 139 community-dwelling elders, age >65 who fell in past 8 weeks with serum 250HD <12 and normal bone biochemistry. Majority were female, White, lived in own homes; no significant differences between placebo or intervention groups. Excluded: those taking Vitamin D supplementation via prescription or OTC; CRF, alcohol abuse, impaired postural conditions, those on medications interfering with stability or Vitamin D metabolism. Intervention: after baseline assessment, computer randomized to treatment or control (placebo) group. One IM injection of 600,000 IU of ergocalciferol or 2 ml of NS administered by an RN not involved in the study. Second assessment was done in 6 months.

Variables: History, physical exam, AMT (abbreviated mental test score), times spent outdoors, SF-36 Health Survey, BMI, falls diary; functional performance (50-foot walk, rising from a chair, ascent and descent of 13 steps), AFPT (Aggregate Functional Performance Test); CRT (choice reactive time); postural stability with a platform; quadriceps strength (measured voluntary contraction) and lab analysis. Intervention: randomization to active treatment or placebo with computerized program. Baseline measurements were repeated at 6 months.

Statistical Analysis: A priori CRT. AFPT primary outcome measures; secondary outcomes measures: muscle strength, postural stability, biochemical measures, number of falls.

Findings: Significant increase in 250 HD levels in intervention group, small but significant increase in the placebo group; placebo group had deterioration in AFPT, the treatment group improved; the placebo group had nonsignificant decrease in CRT while the intervention group became faster; postural stability in the intervention group improved but deteriorated in the placebo group; both groups had a decrease in strength during the trial period; well-being was assessed with SF-36 and showed the placebo group improving significantly over 6 months with no significant change in the intervention group. Vitamin D supplementation in fallers with deficiency benefitted them. Increased functional performance balance time but no muscle strength. Vitamin D supplementation improved neuromuscular coordination but not strength, possibly resulting in decreased falls.

Diener, D. D., & Mitchell, J. M. (2005). Impact of a multifactorial fall prevention program upon falls of older frail adults attending an adult health day care center. *Topics in Geriatric Rehabilitation, 21*(3), 247-257.

Overview: Falls are not an isolated event but a compounding of many factors; the clinicians' clinical assessment determines what risk factors are present, modifiable, and uses a multitude of risk reduction techniques to increase effectiveness, such as the FICSIT Program (Frailty and Injuries: Cooperative Studies of Intervention Techniques). As people age, frequency of falling increases. Elderly more vulnerable due to certain diseases, poor balance, decreased muscle strength; patients with dementia have a diminished ability to perceive they are in danger and decreased perception of safety. Depending on the population, falls will increase. For example, Diener and Mitchell found community-dwelling elderly have a 33% fall rate; if they have dementia and live in the community, that fall rate increases to 60%; if they are living in a long-term care facility with dementia, that rate increases to 75%. Half the elders who fall will fracture their hip(s). Hip fracture brings with it impaired mobility, pain, disability, and dependence, increased costs in dollars to render care, increased family/caregiver burden, decreased lower limb strength, poor gait and balance.

Source: This is a non-randomized treatment and control group study.

Sample: N = 72 men and women age ranges from 41-95 averaging 77 years, mostly female (61%), average MMSE 18.3. Whites = 21, Asians = 11, Hispanics = 29, African Americans = 10, other = 1; 10 dropped from the study final analysis, with 70% of those dropping out suffering with dementia but with no other significant demographic differences. Recruitment was by telephone after first getting a letter addressed to them or their proxies. Those who were able to participate in group exercise for at least 30 minutes without being distracted or disruptive were included in this study of participants of an adult health day care center. TX group = 46, control N = 26.

Aim: To examine whether or not participation in a multifactorial assessment and intervention program would decrease fall rates in frail elderly. Hypothesis: those who received assessment and intervention would fall less than those who did not. Main outcome measures for both groups: number of falls. Outcome measures for treatment group: functional assessment, environmental hazards. The treatment: a multi-factorial, 3-month fall prevention program. The problem: those who were participating in the intervention program, since they were not randomly assigned, were most likely the most coherent and therefore the group that was better off than the control group, so selection bias may have been a factor in this study. The authors later described participants in both groups as having no statistically significant differences in terms of diagnoses, MMSE, and ADLs.

Variables/Instruments: Strength (modified chair rise used in the EPESE); physical performance (usual, fast gait and Timed Up and Go [TUG] test); number of falls (recalled for the past year by participant or proxy). The treatment group got a monthly call for a fall count during the 3-month intervention and 3 months after the intervention. The control group was contacted 6 months from baseline assessment for a fall count; an assessment of the hazards found in the home was done for people in the intervention group. The treatment: physical therapy assessment, a 12-week exercise program of 1-hour classes for at least 3 classes/week for a total of ten 12-week sessions. Data collection spanned a 3-year time period from 2001-2003; an educational program on fall prevention and environmental modification. Dependent variable: fall rates.

Statistical Analysis: SPSS; Chi-squared assessed differences between two groups (faller vs. non-faller); within group repeated measures (difference in falls for the treatment group for the three time periods); t-test: between group differences from baseline to 6 months); ANCOVA: looking at posttest differences between the treatment and control groups.

Findings: There was a significant decrease in falls in the treatment group as compared to the control group, with improvement in two of the four strength and performance measures; a reduction of home and behavioral fall hazards on the part of participants and caregivers at the 6-month follow-up period. Those in the intervention group fell fewer times than those in the control group (27% fell in the treatment group compared to 46% in the control group). Treatment group participants were better at the TUG test and fast gait test by the program’s end. Unfortunately, when the treatment had ended, they lost the progress they made with the exercise interventions. This suggests the need for interventions that are longer in duration. As far as environmental hazards, the treatment group had reduced the number of hazards found by 50%.

Limitations: Heterogeneity of the sample, which means that researchers had to gear interventions to the lowest-functioning individual; short length of the intervention; nonrandomized treatment and control groups; small sample size; not clear what the control group received except that it was usual care, but that usual care was not specified.

DiPietro, L., Caspersen, C. J., Ostfeld, A. M., & Nadel, E. R. (1993). A survey for assessing physical activity among older adults. *Medicine and Science in Sports and Exercise, 25*, 628-642.

Aims: The creation of an instrument, the Yale Physical Activity Scale (YPAS) to measure physical activity in elderly; the repeatability and validity verification of the instrument.

Source: A validation study.

Sample: N = 76 from 12 urban and suburban Connecticut communities for the primary study, with males = 12 and females = 56. For the validation substudy, N = 25, with males = 14 and females = 11.

Ethnicity: No ethnicity specified.

Measures: Using the YPAS, the two-part instrument that takes approximately 20 minutes to administer measures total time of activity/week; energy expenditure; activity dimensions score. Other measures include anthropomorphic score, treadmill testing under the supervision of an exercise technician, a cardiac intensive care nurse, a physician monitoring oxygen consumption and maximal heart rate; vertical movement using Caltrac motion sensor.

Findings: No significant difference in mean activity hours between first and second administration. YPAS showed higher correlation for some activities vs. lower intensity activities, which may indicate lesser accuracy or ability to assess lower activity. Adequate repeatability, some indirect validity. Test, retest reliability 0.42-0.65.

Limitations: A healthy population was used; instrument needs testing for validity for low-intensity behaviors; small sample size; subcutaneous skinfold fat measurements may not be the most accurate measure of body fat.

Dornelas, E. A., Stepnowski, R. R., Fischer, E. H., & Thompson, P. D. (2007). Urban ethnic minority women's attendance at health clinic vs. church based exercise programs. *Journal of Cross-Cultural Gerontology, 22*(1), 129-136. doi:10.1007/s10823-006-9023-1

Sample: N = 76 Hispanic and African American women from a Spanish church and an African American church and women's health clinic. Inclusion criteria: adult, female, not pregnant, not in an exercise program.

Source: Experimental, empirical study.

Aim: To examine identical fitness programs offered in Spanish and English at a hospital-based women's health clinic and two churches (one Spanish-speaking, the other English) to examine the effect of locale on attendance. Site of clinic program: Hartford Hospital, Connecticut. Site of church programs: basements of predominately African American Baptist and Hispanic Catholic churches, Hartford, Connecticut.

Question: How do age, ethnicity, and other demographics affect program participation?

Measures: Baseline, end of intervention (10 wks.), 3 months post last session.

Variables: Weight, waist-hip ratio, BP (done by trained assistants); medical history (self-report); demographics(age, ethnicity, marital status, health insurance, education, employment); exercise (Baecke Questionnaire of Habitual Physical Activity); fat consumption (fat frequency questionnaire, no validity/reliability/ sensitivity given); self-efficacy for exercise scale (confidence to start and maintain exercise; no data given); social support and exercise survey (social support for exercise); Psychological General Well-Being Schedule (psychological well-being, no data given on reliability or validity). DV = attendance.

Intervention: 2x/wk. for 10 weeks, a 50-minute moderate-intensity (what does that mean?) dance aerobic activity given that was culturally appropriate (what does that mean?) in music, movements and language. Salsa offered to Hispanics and Samba to African Americans (what is the difference between the two?). Moderate-intensity exercise (what is that?) is 64-76% of maximal heart rate given by a certified, fitness instructor (what is the instructor certified in? From whom?). Need to define terms and to describe tools.

Statistics: Descriptive statistics: ANOVA (examines the relationship between ethnicity and site to number of sessions attended); logistic and multiple regressions done with coding of attendance as dichotomous and continuous variables.

Findings: Age was a significant factor independently related to attendance, elders age 50-70 attended more than 2x the number of sessions (M = 10.45, SD = 4.49) compared to the youngest ages 17-27 (M = 4.88, SD = 5.04). Older attendees had higher BP, fewer folks at home, less likely to be smokers, were unemployed, and mostly attended the final week of the program. Of 34 women attending the final week, all liked the location, days, and times; all but one liked the instructors; half of the original 76 returned for follow-up at 3 months postintervention; 87% of the women continuing exercise were aged 50-70.

Limitations: Small sample size limited power; unknown plausible reasons older women were more likely to attend exercise included: fewer people at home, fewer barriers posed by competing possibilities, they may have been more concerned about their health, high attrition rate.

Duncan, P. W., Sullivan, K. J., Behrman, A. L., Azen, S. P., Wu, S. S., Nadeau, S. E., Dobkin, B. H., Rose, D. K., & Tilson, J. K. (2007). Protocol for the Locomotor Experience Applied Post-stroke (LEAPS) trial: A randomized controlled trial. *BMC Neurology, 7*, 39.

Aims: To present their proposal for the Loco-motor Experience Applied Post-stroke Trial (LEAPS).

Source: A single-blind, repeated measures (baseline, postintervention, post-12, 24, and 36 sessions over 12 weeks), randomized, controlled trial with three arms: locomotor training program 2 months after stroke; a locomotor training program 6 months after stroke; a home exercise program 2 months after stroke.

Sample: N = 400 men and women age >18, 30 days after stroke of any kind who have lower extremity involvement, who have been cleared by their doctor, able to walk 10 feet with assistance of one person, able to follow three-step commands, community dwellers who can give informed consent recruited from five clinical sites.

Ethnicity: Not specified or addressed.

Measures: Gait speed over 10 meters; distance; daily walking; sensory/motor control (Fugl-Meyer score); balance (Berg Balance Scale); cognition (Mini-Mental State Exam); digit symbol coding; Trails A measure; balance efficacy (ABC scale); depression (Patient Health Questionnaire); stroke disability (Stroke Impact Scale); physical function (SF-36); falls (diary); height, weight, waist circumference; disease comorbidity index (Rigler, Studenski, Wallace, Reker, & Duncan); medications (baseline, 6 and 12 months); usual care logs (participation in activity via monthly calendar).

Findings: Not yet implemented.

Limitations: Study has not been implemented as of this article's publication; no mention of how to ensure the inclusion of minorities, primary sufferers of strokes.

Elliott, S., Painter, J., & Hudson, S. (2009). Living alone and fall risk factors in community-dwelling middle age and older adults. *Journal of Community Health, 34,* 301-310.

Aims: To examine the effect living alone has on fall risk factors.

Source: A 4-year correlational study, part of a larger study. A community-based educational program lasting from 15-60 minutes was given, followed by questionnaire.

Sample: N = 666 community-dwelling elderly age 50-90, residents of a rural east North Carolina county.

Ethnicity: Not specified.

Measures: Demographics (age range, gender, working status/volunteer status, living alone/with others); felt at risk of falling; fall history; use of assistive devices for ambulation; use of an emergency call system.

Findings: Significant association between living alone and gender, with women living alone increasing with each age group and men living alone decreasing with each age group until the 81-and-over age group. Living alone was associated with falling. The percentage of participants notifying others was larger for those living alone than with others for both genders. Those living alone were more likely to tell a friend that they fell (22% vs. 9%) and those with others more likely to tell a relative (74% vs. 57%). Living alone fell more in the kitchen, living room/den and bedroom while those living with others fell outside. Those living alone fell more while walking inside. Of those who fell, almost half were fearful. Living alone was associated with fear. More than half the women and one-third of the men who fell were fearful, with about 75 or 19.5% decreasing activity due to fear. Living alone was associated with serious head injuries compared to those with others, who were more likely to be uninjured, have cuts and bruises and more fractures; living alone used more ambulatory devices and safety equipment compared to those living with others (51% vs. 31%).

Limitations: Small sample size; convenience sampling; one-time data collection; validity/reliability of instrumentation not provided; self-report data collected with no verification of findings; no description of the population from which the sample was drawn; unable to generalize findings to greater population; no mention of ethnicity of participants.

Ellis, A. A., & Trent, R. B. (2001). Hospitalized fall injuries and race in California. *Injury Prevention, 7*(4), 316-320.

Overview: Falls cause of 7% of deaths in California in 1997 and 41% of all nonfatal hospitalizations. Advancing age, female gender, and White race associated with higher fall rates. Fracture rates among Whites nearly double that of Blacks. No studies at the time of this article studied all the races simultaneously.

Source: Correlational study.

Objective: To compare fall risks and fall consequences among Blacks, Whites, Hispanics, Asians/Pacific Islanders in California.

Variables: Dependent variables were fall risks, consequences.

Sample: N = 104,902 cases of 1st admissions into any California nonfederal hospital from 1995-1997 where the principal cause of injury is a same-level fall.

Methods: E-codes (external codes), which records all incident cases to avoid duplication between 1995-1997 for nonfederal acute care hospitals in California, were used. Cases defined same-level slips, trips, stumbles of all ages resulting in hospitalization in the designated time, corresponding with code E885. In elderly, fractures associated with osteoporosis; only 8.3% of fall cases aged >55 had osteoporosis. N = 104,902 residents fitting criteria for cases.

Statistics: Nonoverlapping CIs, with statistical significance 95%.

Findings: Falls increased especially between ages 50-59; Whites had highest fall rates (161), followed by Blacks (64), Hispanics (43), Asians/Pacific Islanders (35); predominant fracture was hip, with Whites twice that of Hispanics and Blacks, three times that of Asians/PIs; Whites transferred to long term nursing care at significantly higher rate, females especially Whites and Hispanics highest rate of transfer to long-term care than males. Costs of hospital charges attributed to falls increased significantly after age 80. Whites: costs for fall-related injuries after age 60 significantly increased compared to other ages.

Limitations: Researchers unable to study known risk factors for falls since that information was unknown (environment, medications use).

Ensrud, K. E., Ewing, S. K., Cawthon, P. M., Fink, H. A., Taylor, B., Cauley, J. A., Damm, T. N., Marshall, L. M., Orwall, E. S., & Cummings, S. R. (2009). A comparison of frailty indexes for the prediction of falls, disability, fractures and mortality in older men. *Journal of American Geriatrics Society, 57*, 492-498.

Aims: To test the Study of Osteoporotic Fractures index (SOF) and the Cardiovascular Health Study (CHS) indexes and observe if predictive validity is similar.

Source: A prospective cohort study.

Sample: Men age >67 from the Osteoporotic Fractures in Men Study (MrOS); N = 3,132.

Ethnicity: Not specified.

Measures: Falls using a postcard and after the second examination and every 4 months thereafter with more than 99% of the follow-up contacts complete; functional status at the second examination and an average of 1.2 years later at the third examination; disability defined as one or more new impairments of IADL; fractures using x-ray with an average follow-up of 3.1+/-0.7 years; mortality via death certificates with an average follow-up of 3.2 +/-0.5 years. Other variables: medical history, physical activity, depression, cognition, reports of changes in IADLs, physical function measures, BMI, bone mineral density at the hip.

Findings: Classification of frailty using both indexes was concordant in 71% of men; kappa statistic was 0.59; the Spearman correlation between both indexes was 0.70 ($p < .001$). Using either index, the area under the curve (AUC) was nearly identical (SOF = .71, CHS = .70, $p = .19$). Nearly no difference was noted in AUC statistics in regarding odds of incident disability. Frailty and mortality rates were similar using both indexes.

Limitations: Findings may not be applicable to older men who are not community-dwelling; three components on CHS index defined similarly but not identically to the components in the original definition.

Ensrud, K. E., Ewing, S. K., Taylor, B., Fink, H. A., Stone, K. L., Hillier, T. A., Cauley, J. A., Hochberg, M. C., Rodondi, N., Tracy, R., & Cummings, S. R. (2008). Comparison of two frailty indexes for prediction of falls, disability, fractures, and death in older women. *Archives of Internal Medicine, 168*, 382-389.

Aim: To compare the Study of Osteoporotic Fractures Frailty Index (SOF) to the Cardiovascular Health Study (CHS) index in terms of the ability to predict falls, disability, fractures, and death.

Source: A prospective cohort study.

Sample: N = 6,701 community-dwelling women age >69, who participated in four waves of the study from 1986-1994. Those unable to walk without assistance or with a history of bilateral hip replacement were excluded.

Ethnicity: Whites.

Measures: Falls/fractures every 3 months via postcard with confirmation via x-ray; functional status at the fourth and sixth examination before 1/2006; incident disability (1 or more impairments in ADLs); deaths assessed every 4 months and confirmed with certificates; assessment using the SOF (unintentional weight loss of 5% or more between third and fourth examination; inability to rise from a chair five times without using the arms; a “no” answer to the question “Do you feel full of energy?”), robust = no components, pre-frail = having 1 component; assessment using the CHS scale (unintended weight loss of 5% or more between third and fourth examination; grip strength in the lowest quintile stratified by body mass quartile; a “no” response to the question “Do you feel full of energy?”), robust = no components, 1-2 components = pre-frail; walking speed in the lowest quintile stratified by median standing height; a weighted score in the lowest quintile of kilocalories/week spent; height, weight, BMI; bone mineral density at the femur; grip strength (dynamometer); usual walking speed; cognitive function (MMSE score); ability to perform IADLs; self-rated health; smoking; estrogen use; educational level; medical conditions.

Findings: AUC statistics almost identical using either (SOF = .67; CHS = .68); almost identical in multivariate model (AUC = 0.68 with SOF; AUC = 0.69 with CHS, *p* = .42) in terms of discriminating disability; non-spine fracture (AUC = .65 for both, *p* = .86; hip fracture (AUC = .73 both, *p* = .96); death (AUC = .74, *p* = .17). The SOF is shorter and will yield similar findings; is probably more practical for clinicians.

Limitations: Participants were ambulatory, community-dwelling, White women; generalization to other types of participants difficult; fall assessment done every 4 months, leaving the opportunity for omission due to inability to recall fall event.

Ensrud, K. E., Ewing, S. K., Taylor, B. C., Fink, H. A., Stone, K. L., Cauley, J. A., Tracy, J. K., Hochberg, M. C., Rodondi, N., Cawthon, P. M., & the Study of Osteoporotic Fractures Research Group. (2007). Frailty and risk of falls, fracture, and mortality in older women: The study of osteoporotic fractures. *The Journals of Gerontology: Series A, Biological Sciences and Medical Sciences, 62*, 744-51.

Aim: To examine the relationship between increased fall rates in the first 4 years of follow-up and the subsequent fracture rate.

Source: A prospective cohort study.

Sample: N = 9 <106 community-dwelling women age >65.

Ethnicity: Whites; Blacks excluded due to low hip fracture rate.

Measures: Covariates include physical activity, alcohol and cigarette usage, medical history, personal and family history of fracture, use of medications, IADLs, cognition, height, weight, waist/hip circumference, grip strength, triceps extensor strength, tandem stand, gait speed, chair stand, corrected visual acuity, near and far depth perception, contrast sensitivity and bone mineral density. Outcome variables are falls and fractures. Falls were self-reported every 4 months via postcards and telephone calls for the duration of the study. The predictor variable was the Study of Osteoporosis Frailty Index (SOF-FI).

Findings: Frailty increased concurrent fall risk (OR 1.38, 95%, CI 1.02-1.88), hip fracture (MHR 1.40, 95%, CI 1.03-1.90), any non-spine fracture (MHR 1.25, 95%, CI 1.05-1.49), and death (MHR 1.82, 95%, CI 1.56-2.13).

Limitations: Falls only assessed every 4 months, leaving opportunity for participants to forget fall occurrences; findings applicable to Whites only, other ethnic groups excluded; community-dwelling elderly only.

Fatalities and injuries from falls among older adults—United States, 1993-2003 and 2001-2005. (2007). *JAMA: Journal of the American Medical Association*, *297*(1), 32-33.

Source: A correlational study using data on fatalities were obtained from Vital Statistics of the United States from 1993-1998 on fall-related deaths and recorded using ICD-9 codes ranging from E880-E886.9 or E888 for the years 1993-98. For the years 1999-2003, ICD-10 codes of W00-W19 were used. Data on hip fractures were obtained from NHDS (National Hospital Discharge Survey) and earned ICD-9 codes of 820. Data on nonfatal injuries were from NEISS-AIP (National Electronic Injury Surveillance System-All Injury Program) from 2001-2005 and included patients treated in EDs. Annual mortality data was from U.S. Vital Statistics 1993-2003.

Variables: Age, race, gender, sex, fatalities vs. nonfatalities.

Age of Participants: Elderly adults age 65 and older.

Take-home Points: Accidental falls affect 30% of the elderly over age 65 yearly and as of the year 2003 was the cause of death for 13,700 seniors; resulted in 1.8 million people in this age category needing treatment in the ED. Falls are a major cause of debilitating hip fractures. This article reports three 3 main points: fatality rates from falls from 1993-2003; hospitalizations for hip fractures from 1993-2003; and number of nonfatal injuries treated in EDs from 2001-2003.

Findings: There were increases in fatalities in all races from 1993-2003 except for Black men, whose data stayed the same. White men had the most fatalities with 48.3/100,000; then Asian/Pacific Islanders with 36.6/100,000; then Blacks with 22.3/100,000. White women had 32.8/100,000; A/PI: 23.2/100,000; Black women: 22.3/100,000. For hip fractures, there was a decrease by 15.5% from 917.6/100,000 to 775.7/100,000. Annual rate of hip fracture for women was 52-119% higher than men, but hospitalization for fracture was decreased by 20.8% and did not increase significantly, possibly due to better screening and treatment for osteoporosis in elderly women, but may indicate a need, especially in older men, for screening and treatment as age increases and general porosity of bones increases. For nonfatal injuries, the overall rate was not statistically significant by race or sex.

Usefulness to My Study: No indication of differences in fracture rate in Black women after the age of 75, the age in which they experience a great amount of bone loss. No mention of potential disparity in screening and treatment practices.

Faul, A. C., Yankeelov, P. A., Rowan, N. L., Gillette, P., Nicholas, L. D., Borders, K. W., Deck, S., Pariser, D., & Wiegand, M. (2009). Impact of geriatric assessment and self-management support on community-dwelling older adults with chronic illnesses. *Journal of Gerontological Social Work, 52*(3), 230-249.

Aims: To examine the effectiveness of two interventions in a sample of community-dwelling elderly.

Source: A quasi-experimental design using random assignment, pre- and posttest design.

Sample: N = 73 men and women, age >65, literate, permanent living address, a primary physician, no serious medical events and currently not receiving home health care. Mostly females = 60; married = 26; living alone = 32; private home = 39; Medicare or private insurance = 38.

Ethnicity: Whites = 66; Blacks = 7.

Measures: Self-efficacy for disease management (Self-Efficacy for Managing Chronic Disease 6-Item Scale; higher score = greater confidence in tasks); Self-rated health (1-item self-rated health instrument); functional status and physical mobility (The Instrumental Activities of Daily Living Assessment rating scale), the Functional Reach Test, The Timed Sit to Stand test, The Timed Get Up and Go test (TUG); Mental health (Geriatric Depression Scale), social network (Lubben Social Network Scale-Revised); physical home environment (fall hazards checklist).
Two protocols—first, Assessment and Brief Intervention Group (ABIG): a multi-disciplinary home-based geriatric assessment including a team that met with clients coordinated a plan and left the client to implement this plan over the next 12 weeks; second, Assessment and Telehealth Intervention Group (ATIG): a multidisciplinary, home-based geriatric assessment including a team similar to ABIG, but adding eight self-management support telephone calls over the 12 weeks.

Findings: Self-efficacy significantly increased between baseline and posttest for all $F (1, 69) = 3.39$, $p = .07$, $n2 = .05$, power = .57. Significant improvement in self-rated health between baseline and posttest for all participants $F = (4, 52) = 8.35$, $p = .0001$ and $n2 = .39$, power = .99. Significant increase in functional and physical mobility between baseline and posttest for all participants $F (1, 55) = 32.60$, $p = .0001$, and $n2 = .37$, power = 1.00. Significant increase in mental health between baseline and posttest $F (1, 67) = 5.10$, $p = .03$, $n2 = .07$, power = .72 for medium effect size. There was a significant decrease in fall hazards between baseline and posttest for all participants, with participants in ABIG showing more change than ATIG.

Limitations: Small sample size; unable to reach power of .80; lack of control group; short baseline to posttest assessment; use of subjective measures; homogeneity of sample with women overrepresented.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analysis using G*power 3.1: Tests for correlation and regression analysis. *Behavior Research Methods*, *41*, 1149-1160.

Aims: To give users of G*Power detailed explanations of the applications of the newest additions directly from the developer of the program to determine power in research studies.

Source: An article describing the types of tests and correlations in determining power in research studies.

Sample: N/A.

Ethnicity: N/A.

Measures: Correlations with both one and two correlations; regressions with one and multiple predictors and generalized linear regressions.

Findings: Since this is not a study, there are no results; only examples and explanations of how to apply the written instructions within the program and rationales for the instructions.

Limitations: N/A.

Faulkner, K.A., Cauley, J. A., Zmuda, J. M., Griffin, J. M., & Nevitt, M. C. (2003). Is social integration associated with the risk of falling in older, community-dwelling women? *The Journals of Gerontology: Series A, Biological Sciences and Medical Sciences*, *58*, M954-M959.

Aims: To examine social factors associated with falls in community-dwelling elderly.

Source: A longitudinal, prospective study.

Sample: N = 6,692 females, age >65 who participated in the Study of Osteoporotic Fractures.

Ethnicity: Whites only, no Blacks.

Measures: Falls over 3 years assessed every 4 months via postcard, with those not responding receiving a follow-up call; social integration scores on the Lubben Social Network Scale (LSNS), with increased scores indicating more social networking; demographic data (date of birth and education); body weight using a balance scale; medical symptoms and diseases via self-report; walking speed; time to complete five chair stands without the use of the arms to assist; Mini-Mental State Exam Scores (MMSE); hearing impairments, functional difficulty (Modified Stanford Health Assessment Questionnaire); shortened Geriatric Depression Scale (GDS) for depression; self-report of fear of falling; distance and depth perception (Howard-Dolman); hand reaction time; static balance (10 seconds with eyes open); self-report of alcohol and cigarette use; medications in the past 4 weeks, with medications categorized by MD or PharmD using the Veterans Affairs Medication Classification System.

Findings: Total of 11,863 falls, with an average of 0.60 falls/yearly (95%, CI = 0.57-0.63) or 600 falls/1,000 women/year. Multivariate analysis showed increased quartiles of family network scores were associated with decreased fall risk ($p < 0.02$). Stronger family networks were associated with 13% decreased risk of falls (RR = 0.87, 95%, CI = 0.78-0.98) in the second, third, and fourth quartile vs. the first.

Limitations: Falls not defined; falls may have been overreported; possible underestimation of risk factors among those with multiple falls; no Blacks included in this study.

Faulkner, K. A., Cauley, J. A., Studenski, S., Landsittel, D. P., Cummings, S. R., Ensrud, K. E., Donaldson, M. G., & Nevitt, M. C. (2009). Lifestyle predicts falls independent of physical risk factors. *Osteoporosis International*, *20*, 2025-2034.

Aims: To identify behavioral, environmental and physical risk factors for falls in a sample of elderly women.

Source: A 4-year prospective study using women from the Study of Osteoporotic Fractures (SOF) assessing falls every 4 months.

Sample: 9,704 eligible with N = 8,378 providing complete data. Elderly, community-dwelling females aged >65 enrolled in the Study of Osteoporotic Fractures (SOF)

Ethnicity: Whites.

Measures: Fall history, use of anti-epileptic medications, having geriatric conditions, were strong risk factors for falls. Smokers had 24% fewer falls than those who did not smoke. Fear of falling, decrease in general health over the past year, and anti-depressant use was associated with 19-20% increase in falls. Those with a 2 SD increase in walking speed were associated with 18% more falls.

Findings: Falls were twice as likely in women with a history of falls at baseline assessment and 62% higher among women using anti-epileptic drugs (AED) compared to women who had never fallen or used AEDs. Smoking was associated with 24% fewer falls compared to those who never smoked. Fear of falling, a decrease in general health in the year prior to baseline assessment, and AED usage was associated with a 19-20% increase in falls. An increase in usual walking pace by 2 SD in speed was associated with 18% increase in falls. Other factors associated with increases in falls were dizziness (16%), benzodiazepine use (11%), high physical activity level in third and fourth quartile compared to women in the first quartile (12% and 16%), and an increase in the number of ADLs with difficulty (12%). Protective factors were tall height, good vision, going outdoors twice/week, good balance.

Limitations: Large sample of elderly White women, making findings applicable to other races and ethnic groups difficult; assessment of degree of CNS medication currently being used not done; no assessment of home or neighborhood hazards.

Faulkner, K. A., Cauley, J. A., Zmuda, J. M., Landsittel, D. P., Nevitt, M. C., Newman, A. B., Studenski, S. A., & Redfern, M. S. (2005). Ethnic differences in the frequency and circumstances of falling in older community-dwelling women. *Journal of the American Geriatrics Society, 53*, 1774-1779.

Aims: To compare the incident fall rates and circumstances of falls over 5.7 years in community-dwelling, elderly African American and White women.

Source: A prospective evaluation of incident falls and retrospective analysis of fall circumstances.

Variables/Tools: Dependent variables include fall rates and circumstances. Independent variables include body mass index (BMI), waist/hip circumference, fall history, chronic illnesses (self-report); cognition with the Mini-Mental State Exam (MMSE, Stafford Health Assessment); depression with the Geriatric Depression Scale (GDS); near depth perception (Randor); grip and quad strength (dynamometer); timed chair stands; smoking/alcohol consumption (questionnaire, no information on validity/reliability); walking for exercise; social interaction (Lubben Social Network Scale).

Ethnicity: African Americans and Whites.

Sample: N = 1,821; with 1,665 Caucasian women and 156 African American women, with a mean age of 76 +/-5, ranging from 65-93 originally enrolled in the Study of Osteoporotic Fractures at the University of Pittsburgh, recruited from population based lists from Monongahela Valley, Pennsylvania; observed from May 1993 to December 1998, an average of 5.4 years for Whites and 3.8 years for Blacks. Follow-up was done after the baseline assessment in 1993-1994 for Whites (all over the age of 70 at exam time) and after the 70th birthday of the African American women (due to younger age).

Measures: Sociodemographics, BMI, waist/hip circumference, self-report of 18 chronic conditions, fall history in past year, functional impairment: cognition (MMSE); IADL (Stanford Health Assessment Questionnaire); depression (CES-D); near depth perception (Randot/seconds); visual acuity (near distance correction); slow walking speed over 6 meters; grip strength (dynamometer); timed chair rises 5x; smoking/alcohol usage over 30 days; walking for exercise (1 block nonstop); social integration with family (Lubben Social Network Scale); standardized fall interview.

Findings: Whites were more likely to fall outdoors on irregular surfaces such as ice, snow, and dirt compared to carpet, wood or linoleum, straight down, laterally or on their posterior, and were less likely to put a hand out breaking hands or wrists. Fall rates were similar among women age <75. Nonstatistically significant increase in rate of falls seen among Whites age >75. Falls were slips/trips associated with use of alcohol, hypnotics/anti-anxiety medications. African Americans had 19% higher rate of chronic illness, twice the prevalence of functional impairments, cognitive and IADL impairment, poor visual acuity, depression, and walking speed despite being stronger. Observed fall rates were 30% higher in Whites vs. African Americans adjusting for age (RR 1.30, 95%, CI = .93-1.83) but were not statistically significant.

In women aged <75, similar fall rates between African Americans and Whites with unchanged results after adjusting for depression, number of chronic illnesses, and grip strength. In women age <75, Whites fell more, but the findings were not statistically significant.

Limitations: Self-report of falls may be an underestimation between race and falls due to “healthy survivor” or cohort effect for Whites; small sample size for African Americans.

Ferrari, H. A., Giovannucci, E., Willett, W. C., Dietrich, T., & Dawson-Hughes, B. (2006). Estimation of optimal serum concentrations of 25-hydroxyVitamin D for multiple health outcomes [corrected] [published erratum appears in AM J CLIN NUTR 2006 Nov; 84(5):1253]. *American Journal of Clinical Nutrition, 84*(1), 18-28.

Source: A review of the literature, a summary of the strongest evidence for optimal serum 25(OH) D concentrations using the strongest evidence as an endpoint. Key words used include: 25 hydroxyVitamin D, Vitamin D intake, bone density, lower extremity strength, and colorectal cancer.

Findings: For the younger and ethnic population, bone mineral density (BMD) is a better endpoint than PTH concentrations; for the elderly, BMD is a better predictor of fractures. Higher serum 25(OH) D is associated with higher BMD throughout the reference range of 22.5 to 94 mmol/L in all subgroups. Desirable serum concentrations of 25(OH) D are 90-100 mmol/L. Benefits of Vitamin D on bone strength if a concentration of 700-800 IU with or without calcium. This could prevent one-fourth of all hip and nonvertebral fractures in older people, the most vulnerable. 700-1000 IU of Vitamin D may increase no fewer than 50% of the population both young and old to 90-100 mmol/L.

Take-home Points/Usefulness to My Study: After adjustment for the following variables (age, sex, BMI, smoking, calcium intake, estrogen usage, poverty/income level, month of Vitamin D measurement), findings indicated that focus should be on difference in BMD by 25(OH) D concentration rather than differences by race.

Ferrer, A., Formiga, F., Plana-Ripoll, O., Tobella, M. A., Gil, A., Pujol, R., & Octobaix Study Group. (2012). Risk of falls in 85-year-olds is associated with functional and cognitive status: The Octabaix study. *Archives of Gerontology and Geriatrics, 54,* 352-356.

Aims: To establish the fall rate in this sample and to examine differences between those who fell vs. those who did not fall.

Source: A cross-sectional examination of a sample from a prospective, population-based study.

Sample: N = 328 men and women born in 1924, who were community-dwelling and age 85 at the time of assessment. Participants were enrolled in one of seven primary care centers in Baix Llobregat, Barcelona, Spain. Females = 202 or 61.6%, majority widowed (53%), living alone (30.5%), primary school education (46.6%), no basic education (34.5%).

Ethnicity: Spaniards, European, White.

Measures: Falls assessed retrospectively 1 year prior to study; morning calcium levels; geriatric assessment including sensory assessment; comorbidities using the Charlson Comorbidity Index (CCI); number of chronic prescriptions; social risk (the Gijon test); quality of life (EuroQuol-5D); perceived health (EQ-VAS) with a visual analog scale; gait using the Gait Rating Scale (GRS) from the Tinetti Performance Oriented Mobility Assessment; cognition using the Spanish version of the Mini-Mental State Exam (MMSE) called the MEC; nutritional status using the Mini Nutritional Assessment (MNA); sociodemographic data (gender, marital status, education, and living arrangement); functional status measured with Barthel Index (BI) which measures basic activities of daily living, and Lawton Index (LI) which measures instrumental activities of daily living.

Findings: Female gender was statistically significant for falling ($p < 0.017$); 93/328 fell at least once, with a fall prevalence of 28.4%; 24/328 or 7.3% fell more than once; total of 133 falls, with a mean of 0.4+/-1.0 falls/subject. Twelve or 3% of falls resulted in a fracture. BI score was significantly different between fallers and non-fallers ($p = 0.027$). Mean serum calcium was 2.3+/-0.1 mmol/l. Factors increasing fall risks were female gender (OR = 1.96, 95%, CI = 1.15-3.33, $p = 0.014$), decreased BI score (OR = 0.98, 95%, CI = 0.97-0.99, $P = 0.007$), and increased MEC score (OR = 1.05, 95%, CI = 1.01-1.09, $p = 0.027$).

Limitations: Cross-sectional study design; retrospective nature of obtaining fall data.

Fessel, K. D., & Nevitt, M. C. (1997). Correlates of fear of falling and activity limitation among persons with rheumatoid arthritis. *Arthritis Care and Research, 10*, 222-228.

Aims: To examine factors associated with fear of falling and activity restriction and to examine how community-dwelling elderly with rheumatoid arthritis (RA) alter activity secondary to that fear.

Source: A cross-sectional study using a panel from the University of California, San Francisco that was randomly referred by doctors.

Sample: N = 570. Females = 75.8%; education = 12.4 years; diagnosis of RA: 115.3 years (standard deviation 10.5); live alone: 25.6%.

Ethnicity: Whites = 82.5%.

Measures: Demographics (age, gender, race/ethnicity; years of formal education; living alone/with others); self-rated health; duration of RA (year diagnosed-1989); depression (Geriatric Depression Scale); physical health (The Health Assessment Questionnaire); pain and severity in 18 specific joints (scale 0-100 with 0 = none and 100 = severe); comorbid conditions; medications; falls in the past year; any injuries/sprains/strains/bruises/doctor visits from the fall; presence of fear of falling/loss of balance; activity limitations (describe how they were limited).

Findings: Nearly half were fearful; equally divided among a little and somewhat/ very; activities were altered by 38%, with 31% falling, 16% falling two or more times. Injury sustained by almost 87%; almost 40% altered walking among those who were fearful, with the remainder only using assistive devices, walked with someone. Females were more likely to be fearful; both genders who were fearful had poorer self-rated health, physical function, pain, depression. Multiple regression showed that being female, having poorer physical function, more pain in joint of the lower extremity, and sprains of muscles placed elderly at risk of being fearful ($p < .05$); physical function, painful joints, poor self-rated health were significant for activity restriction secondary to fear of falling.

Limitations: Limits of a cross-sectional study in establishing causation; the presence of fear question may lack sensitivity and may not predict behavior; potential recall bias.

Finkelstein, J. S., Brockwell, S. E., Mehta, V., Greendale, G. A., Sowers, M. R., Ettinger, B., Lo, J. C., Johnston, J. M., Cauley, J. A., Danielson, M. E., & Neer, R. M. (2007). Bone mineral density changes during the menopause transition in a multiethnic cohort of women. *The Journal of Endocrinology and Metabolism, 93*(3), 861-868.

Aims: To observe bone loss rates at stages of the menopause among a diverse ethnic population of women.

Source: A longitudinal cohort study.

Sample: The sample was drawn from seven clinical sites. Participants were women aged 42-52 not on estrogen therapy, had an intact uterus and at least one ovary, have had one menstrual period in at least 3 months prior to screening, and identify themselves as African American, White, Japanese, and Chinese. N = 1,902.

Ethnicity: African American = 494, White = 944, Chinese = 221, Japanese = 243.

Measures: Bone mineral density (BMD) at the lumbar spine and proximal femur.

Findings: During pre- or early menopause, there was little change in BMD. At late perimenopause, there was 0.018g/cm^2 yr. (1.6%) from the spine and 0.010 gm/lcm^2 yr. loss from the hip ($p < .001$) for both. At postmenopause, there was 0.022 gm/cm^2 yr. loss from the lumbar spine and 0.13 gm/cm^2 loss from the hip ($p < .001$) for both. BMD loss was slowest in African American women in late peri- and postmenopause. Ethnic differences in BMD loss was attributed to differences in body weight. BMD loss at the hip was lowest among women in the highest weight tertiles. These women lost BMD at 35-55% slower than women in the lowest tertile.

Limitations: Longer period of follow-up for the entire phase of the menopause and more frequent follow-up with DXA scanning to track changes in bones during the duration of the study instead of annually.

Finkelstein, E. A., Chen, H., Miller, T. R., Corso, P. S., & Stevens, J. A. (2005). A comparison of the case-control and case-crossover designs for estimating medical costs of nonfatal fall-related injuries among older Americans. *Medical Care, 43*(11), 1087-1091.

Overview: The difference between a case-control and a case-crossover study. Case control: compare costs for those with condition (cases) to those without the condition (controls) using regression to control for observable differences between the two. May not always be able to control for all differences (e.g., injuries more likely occur in small frame or frail even without a fall). Case crossover: compares risks (costs) before and after exposure for a single cohort.

Purpose of Study: To compare cost of illness estimates for nonfatal falls in elderly age >65 generated from case-control and case-crossover designs.

Methods: Claims data from 1998 and 1999 Medicare fee for service standard analytical files.

Variables: (Independent) payment data includes: inpatient, outpatient skilled nursing, home health, hospice, physical supplier services, durable medical equipment. Injuries stratified into three categories: injuries requiring hospitalization; injuries requiring an ED visit but no hospitalization, injuries requiring an office/ outpatient visit but not hospitalization or an ED visit.

Sample: N = 22,514 in 1998 classed as fallers; 29,347 in 1999 fallers, and a random sample of 102,755 non-fallers.

Case-Control Statistics: General linear regression for distribution of costs with log link and gamma distribution controlling for covariates; dummy coding of place of service. Demographic regions and characteristics, comorbid conditions represent X variables.

Case-Crossover Statistics: Comparing monthly costs of fallers before and after falls. General linear regression model with log link and gamma distribution.

Findings: With case-control design, a 12-month hospitalized fall injury costs were $22,260. Using case-crossover design, $20,920, 6% lower (p = <.05), largest difference 10% (p = <.05) age 65-74. ED treated/outpatient/office $3,890 and $5,040 with case control and $3,230 and $4,200 with case crossover. Maximum statistical significant difference 34% age 65-74. Not specific for African Americans: in 1998, they made up 4.98% of fallers, 7.11% of non-fallers. In 1999, they made up 5.24% of fallers.

Folden, S., & Tappen, R. (2007). Factors influencing function and recovery following hip repair surgery. *Orthopaedic Nursing, 26*(4), 234-241.

Overview: Hip fractures requiring surgical repair are increasing with advanced age of the population. Authors explained factors that may predict return to presurgical function that may help providers plan for patients' needs and allocate resources.

Sample/Ethnicity/Age: N = 73; Whites=98.4%; females 66.7%. Average age 73.9 years; 80.6% had incomes <$50,000/yr.; 90.7% living at home; 45.3% living alone. Average number of chronic illnesses was 1.77; number of days spent in acute care was 5.47; 11.66 days spend on a rehab unit.

Source: Secondary data analysis with the primary study using a convenience sample.

Variables/Tools: Dependent variables were predictors of functional ability post-hip fracture repair. Independent variables: fatigue (FSS), depression (GDS), falls efficacy (FES), pain (VVS), cognition (MMSE), IADL (FLS), comorbid conditions (a summation), functional recovery (baseline and 3-month assessment of FLS).

Findings: Three months post-discharge men had higher functional levels, were more likely to return to previous level of function. Those who had surgery due to fracture did not differ significantly from those who did not have surgery. Balance and cognition 3 months post-op were strongest predictors of functional ability and accounted for 54% of variance in functionality. Balance, cognition, and presurgical functional at 3 months postdischarge were primary contributors to return of prefunctional ability. Sixty-eight percent did not return to prior function 3 months post-op. Outside activities equalled statistically significant loss between pre-op and |3 months.

Limitations: Small convenience sample, reliance on recall for measure of pre-op functioning and small sample of ethnic study participants.

Forster, A., & Young, J. (1995). Incidence and consequences of falls due to stroke: A systematic inquiry. *British Medical Journal, 311*, 83.

Aims: A systematic evaluation of incidence, consequences, circumstances, and characteristics of people who fall after having a stroke.

Source: A randomized trial comparing stroke patients discharged to day hospitals vs. home physiotherapy from the Bradford community stroke trial.

Sample: Stroke survivors age >60 with residual deficiencies after stroke who are living at home; N = 108.

Ethnicity: Not specified.

Measures: A fall questionnaire administered face to face; Barthel index (disability); motor club assessment (balance and movement); Nottingham health profile; Albert's test (abuse); loss of sensation; cognitive function and proprioception; comorbidities on a dichotomous scale (present/absent) including poor eyesight, cardiac disease, diabetes, chronic obstructive pulmonary disease, hypertension and past history of stroke; General Health Questionnaire 28 (for main caregivers).

Findings: A total of 23 fell the year prior to the stroke; 50 fell a minimum of once in the hospital; 79 fell 6 months after discharge to home; 31/79 were new fallers; 40/79 fell in the hospital, and 8/79 fell at home. After discharge from the hospital, there was a total of 270 falls, with 51 falling at least twice. Most falls occurred during the day in the lounge or bathroom while attempting basic activities of daily living (BADL); 6 falls occurred on the stairs and 9 falls occurred outdoors. Twenty-four of the 79 fallers were able to get up without help; 36 required assistance from family or caregiver, and 19 required outside assistance from police, ambulance or physical therapists. Most were able to get up quickly, while one remained on the floor at least 3 hours. Four or 1% of the 79 falls resulted in fractures and 1 out of the 79 fallers was admitted. Caregivers worried whether their loved one was injured or not, with levels of worry decreasing slightly over time. Those who fell while in the hospital were significantly more likely to fall postdischarge to home. Fallers had lower balance scores at time of discharge to the community and longer times for walking 5 meters 6 months postdischarge from the hospital compared to non-fallers (12 vs. 24 seconds). No difference between fallers and non-fallers in comorbidities. Fallers were less socially active than non-fallers. Caregivers of fallers were more stressed at 6 months postdischarge from the hospital than caregivers of non-fallers.

Limitations: Small sample size; selective sample that included those with mild to moderate disability scores, those with a caregiver to confirm information given to researchers, those with low disability scores, and younger patients.

Friedman, S. M., Munoz, B., West, S. K., Rubin, G. S., & Fried, L. P. (2002). Falls and fear of falling: Which comes first? A longitudinal prediction model suggests strategies for primary and secondary prevention. *Journal of the American Geriatrics Society, 50*, 1329-1335.

Aims: To identify independent predictors of falls, patterns of falls, fear of falls, and primary prevention strategies to find out if predictors of falls/fear of falls are the same in people at baseline and patterns identified for secondary prevention.

Source: A prospective, observational, population-based study that took place over 20 month using data from SEE (Salisbury Eye Evaluation).

Sample: N = 2,212, Mini-Mental State Exam (MMSE) score >18, aged 65-84 years and recruited from age-stratified random sample from HCFA Medicare eligibility lists. Data collection took place at baseline then 20 months later. Participants completed a questionnaire at home, then received a 4-5-hour clinical examination.

Ethnicity: African Americans made up 25.9% of the study population.

Measures: Demographics (age, gender, race, education); visual assessment (using Early Treatment of Diabetic Retinopathy Study Chart or ETDRS chart, Randot Circles Test, Humphrey Field Analysis); health status (self-report of comorbidities to create a comorbidity index), neuropsychiatric (MMSE, GHQ), medications list (all routes, number of medications dichotomously grouped into four or more or less than four); physical performance (knee extensor, hip flexor strength, vibratory sensation, gait speed, balance; falls/fear of falling (three questions on falling in the past year, fearful of falling, limitations secondary to fear).

Findings: Falling at baseline predicted fear of falls at 20 months as well as becoming a future faller. Fallers not admitting to fear faced higher risk of falling than non-fallers at 20 months. Once fear develops with accompanied activity limitation, it persists even if the person does not fall. Two predictors of falls modifiable for primary prevention are sedative use and fear of falling. Non-modifiable predictors include race, gender, and stroke history. Predictors identified for developing fear of falls are age, female gender, more than four medications, low GHQ score, and history of falling. Healthcare providers should aim to go over medication lists frequently, implementing fall prevention strategies.

Limitations: Falls were defined, assessed without the use of a tool; fear of falling not defined, two questions used but no validated tools; more information needed on the validity/reliability of tools that were used. Nonintervention study, associations made between independent variables and dependent variables (falls and fear of falling).

Fuller, G. F. (2000). Falls in the elderly. *American Family Physician, 61*, 2159-2168, 2173-2174.

Aims: To provide an overview for the practitioner working with geriatric populations.

Source: A review article.

Sample: N/A.

Ethnicity: N/A; addressing the general population of elderly.

Measures: N/A.

Findings: Falls are the leading cause of injury in the U.S. Compared to children, elderly are 10 times more likely to be hospitalized, 8 times more likely to die from a fall. Eighteen thousand falls/year result in death; 9,500 deaths associated with falls in elderly yearly. Elderly are hospitalized twice as long after falling compared to any other admitting diagnosis, with increased risk of institutionalization. Cost of hip fracture exceeded $1 billion in 1996, and was the leading cause of hospitalization. Risk factors for falls include advancing age, particularly past age 75; White race; use of assistive devices for ambulation; chronic illnesses; poly-pharmacy; cognitive impairment; sensory/neuromuscular decline; foot problems; environmental and behavioral factors. Besides physical trauma, psychological trauma results in fear of falling, restriction of further activity, dependence, immobility, and further physical decline. Practitioners are given a mnemonic (I-HATE-FALLING), a home safety checklist for assessment of elderly for falls and near falls. Assessments must include a thorough history, a risk factor assessment (both internal or intrinsic and external or extrinsic factors), and physical performance assessment. Interventions should be individualized to the patient and should include family and significant others to reduce falls.

Limitations: Generalized to majority outpatient population.

Furstenberg, A. L., & Mezey, M. D. (1987). Differences in outcomes between black and white elderly hip fracture patients. *Journal of Chronic Diseases, 40*, 931-938.

Aims: To examine the differences between Black and White hip fracture patients in terms of physical and mental impairments and short-term outcomes.

Source: Retrospective chart review.

Sample: N = 119; age >60 and admitted over 3.5 years into a metropolitan teaching hospital; community-dwelling residents with a diagnosis of hip fracture.

Ethnicity: Blacks N = 37, Whites N = 82.

Measures: Mental impairment (from providers' notes at admission, postsurgery, and at discharge); hip fracture type and procedure used to repair it (fracture types include trochanteric, cervical or other, and repair types include fixation or replacement); socioeconomic status by proxy (does the patient have a private orthopedist or belong to an orthopedic group?); short-term outcomes (ambulation modes via medical record include non-ambulatory, ambulatory with a walker or cane or no device; length of hospitalization and destination to either prior residence with/without services, a new community residence, a rehabilitation facility or nursing home);

Findings: Greater proportion of Blacks had mental impairment during the hospitalization compared to Whites (71 vs. 37.1 at $p < .005$), with Blacks more likely to be more persistently impaired postoperatively. Blacks had higher levels of physical impairment, had more diagnoses (3.8 vs. 2.8, $p < .01$), were more likely to be incontinent (66% vs. 36%), had lower hemoglobin levels on admission (less than 11g/dl for a third of Blacks, almost three times the number of Whites). Most Whites were private patients (80%) compared to the majority of Blacks (70%) who were service patients. More Blacks were treated nonsurgically (22.2% vs. 9.8%), were sicker than those undergoing surgery, and had a greater number of diagnoses. Mortality for Blacks was 11% compared to 7.3% for Whites while in the hospital. Blacks were hospitalized longer (41.2 days vs. 30.4 days), with 57% hospitalized >30 days ($p < .01$) vs. 27% of Whites. Blacks stayed twice as long if they were incontinent. Blacks were more likely to be discharged home with some type of services. No Blacks were discharged to a rehabilitation facility, while 11 Whites were. Blacks with mental impairment and incontinence were discharged to nursing homes, while 40-50% of Whites who were neither mentally impaired nor incontinent were discharged to nursing homes.

Limitations: Sample size was small; study correlational in nature.

Gallagher, J. C., Rapuri, P. B., & Smith, L. M. (2007). An age related decrease in creatinine clearance is associated with an increase in number of falls in untreated women but not in women receiving calcitriol treatment. *Journal of Clinical Endocrinology and Metabolism, 92*(1), 51-58.

Overview: Elderly given calcitrol or alphacalcitrol had fewer falls. Serum creatinine clearance <65 ml/min was identified as an independent risk factor for falls, fracture incidence.

Participant Characteristics: N = 489 from the STOP IT trial, no indicators of race and no demographic data; 415 participants completed data collection. Study design: a 3-year, double-blind, placebo controlled study with randomization to one of four groups with repeated measures every 6 months for falls.

Variables/Tools: Dependent variables included falls/fallers; comparing those with creatinine clearance <60 to those >60. Independent variables were dietary intake (diaries, Food Process II), medication usage and comorbidities, alcohol and tobacco use, fasting blood and 24-hour urine for creatinine clearance at baseline and end of study, serum 25 (OH) 2D, serum PTH, collagen cross-links; PASE (Physical activity), grip strength (dynamometer), timed walking speed (normal and fast).

Findings: Those with baseline low creatinine clearance had lower PASE scores in timed tests, weaker grip, with findings similar between the two creatinine clearance groups in all treatment groups. Calcitrol reduced number of fallers 46% at 36 months; other treatment groups had no effect on fallers. Calcitrol decreased by 25% adjusted rate of fallers in calcitriol and ET/HT group. Recipients of placebo who had creatinine clearance <60 ml/min had 63% more falls. No difference in number of falls/person in treatment groups. Those getting calcitriol had significantly lower rate of falls in both <60 and >60 creatinine clearance groups, but effects were more significant in the low creatinine clearance group.

Limitations: Falls not the primary outcome; falls were self-reported and healthy Whites were study participants, as revealed in the end.

Garber, C. E., Greaney, M. L., Riebe, D., Nigg, C. R., Burbank, P. A., & Clark, P. A. (2010). Physical and mental health-related correlates of physical function in community-dwelling older adults: A cross-sectional study. *BMC Geriatrics, 10*, 6.

Aim: To identify and examine correlates of physical function in a sample of community-dwelling elderly.

Source: A randomized, four-group intervention study: physical activity, diet, physical activity and diet, and a contact condition. Data collection was done at 24 months, at the end of the 12-month follow-up (no intervention).

Sample: Community-dwelling males and females, age >60 (mean age 76.6 years), from East Providence, Rhode Island and the vicinity who were participants in the Study of Exercise and Nutrition in Older Rhode Islanders (SENIOR) Project. N = 904, with males = 263 and females = 692.

Ethnicity: Blacks = 20; Whites = 692; Portuguese/Cape Verdean = 124.

Measures: Sociodemographics (age, sex, race/ethnicity, marital status, years of education, income). Outcome measures were physical activity measured with the Yale Physical Activity Survey (YPAS); health-related variables such as height, weight, body mass index (BMI), number of separate medications taken daily, number of falls over the past 6 months via self-report to the question “How many times have you fallen over the past 6 months?”; health quality of life with the Medical Outcome Study (MOS) Short Form-36, version 2; social support and depression with the Medical Outcomes Study Social Support Scale and the Geriatric Depression Scale Short Form (GDS); physical function with the Timed Up and Go Test (TUG).

Findings: Participants' TUG score averaged 8.7 seconds, with kcal/wk. expenditure of 6,976. Average time in min./wk. for exercise was 238.3. BMI was 27.3, with participants on an average of 3.8 medications daily. Falls in the past 6 months averaged 0.22. Mental Component Summary Score was 50.6 and Physical Component Summary was 41.3. Adjusting for TUG floor surface, the following were independent predictors of physical function: general health, age, sex, body pain, years of education, BMI, number of medications daily, GDS score, and total weekly energy expenditure.

Limitations: Researchers noted lacking standardization for floor surface and the chair used in the TUG; sample may not represent majority in the community despite randomization.

Geller, S. E., & Derman, R. (2001). Knowledge, beliefs and risk factors for osteoporosis among African American and Hispanic women. *Journal of National Medical Association, 93,* 13-21.

Aims: Instrument development and validation; assessment of risk knowledge, beliefs, and attitudes; healthy and nonhealthy behaviors.

Source: Cross-sectional survey.

Sample: N = 206; age >18 from University of Illinois Women's Care Clinic and nearby service communities from February-May 1999.

Ethnicity: African Americans N = 65%, Hispanics N = 33%, Whites N = 1.5%.

Measures: Sociodemographics, GYN history, height, weight, body mass index (BMI), general health and family history. Knowledge: questions on sources and where information was obtained; list of 22 risk factors associated with osteoporosis for a calculated score of number correct. Attitudes: questions on osteoporosis compared to other diseases; questions on how concerned, likely, serious and personally responsible. Prevention: in past year, weight-bearing exercises for frequency, duration, and intensity in number of minutes/7 days of the week. Calcium: using Kasper's modified instrument, intake and frequency calculated.

Findings: 70% knew what osteoporosis was, most learned about it through television (77%), physician (66%), and newspapers/magazines (64%). Over half knew family history, smoking as risks, but a third knew steroids, body frame, lack of sun/Vitamin D, oophorectomy, amenorrhea were risks. Many thought race was protective, with Hispanics taking more personal responsibility than African Americans. African Americans and Hispanics were more concerned about and thought the following diseases were more serious: cardiac diseases, diabetes, cancer. 32% were obese, 41% pre-obese, 26% obese; 42% smoked, alcohol use was low, 12% on steroids secondary to asthma; 72% consumed less than RDA for calcium;

8% consumed 1000-1200 mg calcium/day; 44% exercised 3 times per week for 20 minutes per session; 25% of this number did high-intensity exercise. 85% were age 18-49, 15% over age 50.

Limitations: Instrumentation validity/reliability and explanation not provided; sample size small; one-time study.

Gill, D. P., Zou, G. Y., Jones, G. R., & Speechley, M. (2008). Injurious falls are associated with lower household but higher recreational physical activities in community-dwelling older male veterans. *Gerontology*, *54*, 106-115.

Aims: To see what role injurious falls have on household physical activity (PA) and recreational physical activity (PA).

Source: A randomized trial in which participants were in either the Specialized Geriatric Services (SGS) group or the Family Physician (FP) group. Those in the SGS group received both a comprehensive assessment and individualized risk reduction advisement. Those in the FP group received a letter with the risks identified on screening, with notification sent to their doctors. Those without identified risk factors were in the third arm of the study known as Zero Mod. The Zero Mod group received educational materials on fall prevention.

Sample: N = 200 male veterans of World War II and the Korean War average age 81 (SD 3.8), with 64 classified as injurious fallers.

Ethnicity: Race not addressed in this study.

Measures: Explanatory variables were injurious falls and non-injurious falls. Covariates were age, financial strain, self-rated health, a self-report of physical activity on a scale comparing themselves to their peers, number of physician visits in the past month, number of days per week they consumed more than two alcoholic beverages, number of current prescription medications, the last time they had their eyes checked, self-report of loss of balance, whether their residences had multiple levels. Outcome variables were household physical activity and recreational physical activity measured with Phone-FITT in a follow-up 1 year later.

Findings: Injurious fallers vs. non-fallers and non-injurious fallers had a household PA score that was 3.1 points lower and recreational PA score that was 3.4 points higher (adjusting for age, baseline PA, self-rated health, foot problems, balance problems, inability to stand without using armrests, vision and memory).

Limitations: The follow-up group was more active, with higher self-rated health at the outset; Phone-FITT was not administered at baseline, it was only administered at the end of the study so increases or decreases in activity are unknown; self-report of falls as well as other data; researchers were not able to assess depression or anxiety.

Gillespie, S. M., & Friedman, S. M. (2007). Fear of falling in new long-term care enrollees. *Journal of the American Medical Directors Association, 8*, 307-313.

Aims: To examine incidence of fear of falling in new enrollees in long-term care (LTC) and to identify treatable risk factors in new enrollees to LTC.

Source: Prospective cohort study.

Sample: N = 112 using data from the study called "Function, quality of life and health care utilization in 3 LTC models: Long-term health care program (LTHCP), a skilled nursing facility (SNF), a Program for All Inclusive Care for the elderly (PACE)," age >55, English-speaking with a life expectancy of at least 3 months.

Ethnicity: Not specified.

Measures: Potential participants initially prescreened for impairment (3-item recall and three simple questions rating health) within 3 weeks of enrollment in LTC program. If they passed prescreening, they were given questionnaires including falls efficacy scale (FES) and geriatric depression scale (GDS). Participants asked if they were afraid if they might fall and, if so, did they curtail activities. Additional assessments included self-report of medical conditions (angina, hypertension, coronary artery disease, congestive heart disease, myocardial infarction, stroke, chronic obstructive pulmonary disease, arthritis of the knee/hip/wrist/hand, diabetes, low back pain, inflammatory bowel disease, and cancers except for skin); physical performance (gait speed walking 4 meters, Lafayette Manual, grip strength via dynamometer, Berg Balance Test); Mini-Mental State Exam (MMSE).

Findings: No significant difference in prevalence of fear of falling in those with a history of falling compared to those without a history of falling. Those who were fearful of falling were most likely to have low back pain, lower extremity arthritis, and weaker knee extension. Participants with higher FES scores were least likely to report angina. No significant relationships between falls self-efficacy and medical conditions. Prevalence of fear of falling significantly lower in the PACE program compared to the LTHCP. Forty-one of 54 participants had fear of falling with activity modification.

Limitations: Small sample size, ethnicity not addressed.

Gitlin, L. N., Winter, L., Dennis, M. P., Corcoran, M., Schinfeld, S., & Hauck, W. W. (2006). A randomized trial of a multicomponent home intervention to reduce functional difficulties in older adults. *Journal of the American Geriatrics Society, 54*(5), 809-816.

Overview: Fear of falling is one of several outcome measures that make performing ADLs/IADLs difficult, resulting in referral for homecare services, change of home environment and behavior to help elderly maintain functionality, adapt and decrease fear of falling.

Sample/Ethnicity/Age: N = 319; 159 controls and 160 experimental group; age >70 years; females = 81.8%, living alone = 61.8%, 52.7% Whites, 45.5% African

American; education <high school = 31%, average number of health conditions = 7. Stratified by race and living arrangement; recruited from the community.

Source: Randomized, controlled trial, using 2 groups and a no-treatment control group; a prospective design with assessment at 6 and 12 months, utilizing the Lifespan Theory of Control as a theoretical base.

Variables/Tools: Dependent variables included functional difficulties (self-rated); fear of falling (FES, 3 items of ABC); self-efficacy (self-rated); presence of hazards (outside observer with a tool); adaptive behaviors (self-rated with an unpublished tool). Cronbach's alphas given for the sample. Independent variables included demographics, cognition (MMSE), and number of health conditions.

Findings: Intervention group at 6 months had fewer difficulties with ADLs and IADLs than controls; less fear of falling and increased confidence, increased use of control strategies, fewer home hazards, improved 11 out of 18 specific activities, with statistical significance for bathing, grooming, meal preparation. Similar findings at 12 months in three out of five primary and two secondary outcomes with magnitude half of the 6-month results for function-related self-efficacy.

Limits: No-treatment control group may have caused effect; subjective reports and no objective measures; more motivated sample.

Gitlin, L. N., Winter, L., Dennis, M. P., & Hauck, W. W. (2008). Variation in response to a home intervention to support daily function by age, race, sex, and education. *The Journals of Gerontology: Series A, Biological Sciences and Medical Sciences, 63,* 745-750.

Aims: To examine the effects age, gender, race and education have on elderly participating in a 6-month intervention to decrease fear of falling and functional disability.

Source: A two-group randomized controlled trial with assessments at baseline, 6 months and 12 months. Controls = 159, experimental group = 160.

Sample: N = 319; mean age 79, mostly female (82.8%), living alone (62%), education >high school; average of 7 health conditions; 70% rated health as poor; some to a lot of difficulty with activities of daily living and instrumental activities of daily living (ADLs/IADLs) and mobility.

Ethnicity: White 53%, African American 46%.

Measures: Dependent variables include functional difficulties (self-rated scale; Cronbach's alpha given); self-efficacy (rating scale, Cronbach given); fear of falling (10 items of Falls Efficacy Scale or FES, 3 items from Activities Specific Balance Confidence Scale or ABC, Cronbach given). Independent variables include demographics (age, race, gender, education).

Findings: For ADLs at 6 months, nonstatistically significant interaction effects of intervention for sex, age, race, education. At 12 months, statistically significant treatment x race interaction (Whites fewer IADL difficulties than AAs). Self-efficacy: at 6 months, statistically significant interaction for treatment x sex (females' self-efficacy increased). At 12 months, treatment x age and education (older, less educated had increased self-efficacy). Fear of fall statistically significant interaction: treatment x education at 6 months (less educated has less fear of falling).

Limitations: Self-report heavily relied upon, no tool for objective assessment.

Gobbens, R. J., Luijkx, K. G., & Wijnen-Sponselee, M. T. (2010). In search of an integral conceptual definition of frailty: Opinions of experts. *Journal of the American Medical Directors Association, 11*, 338-343.

Aims: The development of a definition of frailty incorporating a holistic definition of the person.

Source: A report of the results of an extensive literature search, two meetings, development of a questionnaire.

Sample: N = 20 experts, which was defined as having a scientific publication, and representing general medicine, gerontology, nursing, biological statistics, general practitioners, and psychiatry.

Ethnicity: Not addressed, not applicable.

Measures: No measures, but the development of a questionnaire by 14/20 experts, with these experts ranking their definition of frailty incorporating instruments that address the whole person in the assessment of frailty (Rockwood).

Findings: The definition describes frailty as being dynamic, a loss of one or more domains of function (physical, psychological or social) caused by the effect of multiple stimuli that put the individual at risk of adverse outcomes.

Limitations: Methodology in the rating of the definitions could have been clearer.

Gohdes, D. M., Balamurugan, A., Larsen, B. A., & Maylahn, C. (2005). Age-related eye diseases: An emerging challenge for public health professionals. *Preventing Chronic Disease, 2*(3), A17.

Overview: AREDs (Age Related Eye Diseases) affect 1 in 28 Americans over age 40; expected that number of blind persons to double by year 2020; types diabetic retinopathy (DR), macular degeneration (MD), cataracts (CAT), glaucoma (GLA). The authors give an overview of the characteristics of the four types of diseases, the prevalence, projected increases and the public health impact of these diseases in terms of costs to the public and to individuals and how it will impact society, especially in minority populations.

Source: A narrative review of the literature.

Take-home Points: Information applies to the general population and is not specific to African Americans or any other ethnic population.

Gopaul, K., & Connelly, D. M. (2012). Fall risk beliefs and behaviors following a fall in community-dwelling older adults: A pilot study. *Physical and Occupational Therapy in Geriatrics*, *30*, 53-72.

Aim: To explore whether actions taken by elderly to remove fall hazards from their dwellings was influenced by personal fall risk awareness.

Source: A combination of an experimental and qualitative design.

Sample: N = 8 participants, with women = 6 and men = 2. Mean age was 78.8 +/-9.6 years, range of 61-92 years. Participants were recruited with posters in the community. Those interested were screened with the telephone version of the Mini-Mental State Exam (T-MMSE), with those scoring less than 17 out of 22 excluded as well as those with uncontrolled medical conditions.

Ethnicity: No mention of ethnicity in this study.

Measures: Three scripted, semi-structured individual interviews lasting 60 minutes conducted to get information about the fall, fall prevention beliefs and behaviors (last interview). Fall-related constructs obtained with the Falls Behavioural Scale (FaB) for the Older Person, the Falls Efficacy Scale (FES) confidence in performing activities of daily living (ADL), and the Activities Specific Balance Confidence Scale (ABC) to measure a wider range of activities than the FES; static and dynamic balance (the Biodex Balance System); Berg Balance Test (BBS) and Timed Up and Go (TUG). A home safety booklet was made based on photographs taken of environmental hazards within their home that were modifiable along with a safety checklist.

Findings: Three of the 8 had fall risks; 5 out of 8 lived in single-family homes; 4 of 8 used a four-wheel walker; 6 or 8 had someone near to help; 4 of the 8 had lower self-confidence and corrected greater than half of suggested modifications. Three of the 8 had Biodex scores that showed poorer balance vs. the norm for the age and gender-matched peers; 3 of the 8 were at risk of falling based on Biodex. Protective behaviors increased for 6 but decreased for 2 others between first and second interviews. Participants had heightened feeling of awareness, an input or something causing them to think of falls and to be concerned. Acceptance that age was a factor to consider with falls and that falls could limit ability to get around in the home.

Limitations: Small sample size; recruitment of a relatively healthy sample and those who did not use assistive devices; excluded were those who fell outdoors; findings may not be applicable to elderly unlike this sample.

Grayson, V. K., Velkoff, V. A., & U.S. Census Bureau. (2010). *The next four decades: The older population in the United States.* Retrieved January 1, 2011, from http://www.census.gov/prod/2010pubs/p25-1138.pdf.

Aims: To inform of the expected changes in the population in terms of race/ethnicity, age, and sex between the years 2010-2050.

Source: A government fact sheet.

Sample: Using a cohort component method and based on the 2000 Census report to make projections.

Ethnicity: Describes Whites/Caucasians, Blacks/African Americans, Hispanics, Asians, and Pacific Islanders.

Measures: N/A.

Findings: The baby boomers will be the majority population among the age group 65-74 until 2034, when baby boomers will be over the age of 70. The oldest old population is expected to grow from 5.8 million to 8.7 million from 2010-2030. By 2050, this group is expected to increase to greater than 21%. Those who identify themselves as single-race Whites will decrease in population by 10% among 65 years and older age group and by 9% among the 85 years and older group between the years 2010-2050. The over-85 age group will be less racially diverse than the 65 and older age groups. The older population will be 42% minority by 2050, up from 20% in 2010. By 2050, 20% of the population is expected to be Hispanic, up from 7% in 2010. Between 2010 and 2050, the oldest of the old Hispanic population will increase 10%. Among the sexes, by 2050, the female population over the age of 65 is expected to be 55%, down from 57%, and may be due to increased life expectancy of men. Among the 85 years and older group, the female population is expected to be 61%, down from 67% in 2010.

Limitations: N/A.

Greenspan, S. L., Resnick, N. M., & Parker, R. A. (2005). The effect of hormone replacement on physical performance in community-dwelling elderly women. *The American Journal of Medicine, 118*(11), 1232-1239.

Overview: The authors attempted to examine elderly women taking HRT vs. those not taking HRT to evaluate on a large-scale physical performance measures.

Sample/Ethnicity/Age: N = 373; intervention = 187, placebo control group = 186; age 71.3 years; on three medications. Both groups prior to randomization did a 3-month run in period with HRT, alendronate placebo, calcium, and Vitamin D.

Source: A 3-year, double-blind, placebo-controlled, randomized controlled study with repeated measures.

Variables/Tools: Dependent variables included physical performance assessment (previously tested measures); PASE (physical activity); IADLs (27 points); MMSE (cognition); height, weight, BMI, 25(OH) D, hct, medications; falls. No validity/ reliability on tools, no tools to assess falls. Independent variables included conjugated equine estrogen 0.625mg/day +/- medroxyprogesterone vs. placebo. All women got Oscal+ and a multivitamin.

Findings: 50% on HRT fell, 51% on placebo fell. Balance scores stable for both groups, no statistically significant rate or pattern of decline, no difference in women receiving estrogen vs. estrogen progesterone; no differences in change in PASE, IADL scores over the study period in either group; slight improvement in MMSE scores over study period, but this improvement only for the placebo group.

Limits: Not all elderly women in general population could tolerate run in phase; MMSE may not have found subtle changes over time, quality of life not assessed (affects outcome measures); no validity/reliability information on tools.

Grisso, J. A., Schwarz, D. F., Miles, C. G., & Holmes, J. H. (1996). Injuries among inner-city minority women: A population-based longitudinal study. *American Journal of Public Health*, *86*(1), 67-70.

Overview: Little information is available on violent injuries in African American women. PIPP (Philadelphia Injury Prevention Program) studied records from 11 emergency departments from January 1, 1987-December 31, 1990, vital statistics and death certificates for data.

Source: An epidemiological chart review. A case was defined as any injury sustained by a resident in the study area resulting in them getting treatment at that emergency room. Quality control methods to reduce duplication keep case ascertainment >90% and are as accurate as required by ICD-9 (International Classification of Diseases, 9th revision) and E-Code (Poisonings). Rates of treatment, admission or death calculated per 1,000 women, with intercensus estimates used as the denominator from 1990 census data.

Variables: Outcome variables were fatal and nonfatal injuries.

Sample: Women age >15 to >65, seeking care at one of the 11 emergency rooms during the 4-year study period, African American females.

Findings: Injury rates were highest among 25-34 year olds; 804 hospitalizations caused by falls. Violence was the leading cause of injury, with the pattern of males as assailants 82% of the time; a husband or boyfriend most often was the assailant followed by a male or female relative 24% of the time. Across all age groups, women aged 25-34 had the highest incidence of falls followed by women over age 65. This was surprising as it was expected that the older women would have the greatest percentage of falls. Some speculation on the part of the researcher that the falls sustained by the younger cohort may have been sustained during an act of violence and may be underreported.

Limitations: Women not included were those who did not seek care in emergency rooms; circumstances of injuries were not recorded providing few details (with no reason indicated by HCPs why); with the high rate of falls recorded for a younger population and no other information to go by, it is left to the researcher to suspect that the falls were secondary to another injury. While the focus is not on the elderly, they are mentioned.

Grisso, J. A., Schwarz, D. F., Wolfson, V., Polansky, M., & LaPann, K. (1992). The impact of falls in an inner-city elderly African-American population. *Journal of the American Geriatrics Society, 40*(7), 673-678.

Source: A prospective cohort study.

Aim: To report sequelae of falls in this elderly population of African American senior citizens residing in the community, their status at baseline, 2 months and 7 months postfall for predictors of recovery and health status.

Sample and ethnicity: N = 197 elderly, African American men and women, age >65, seen for injury due to a fall between September 1987 and November 1988. These were participants in the Philadelphia Injury Prevention Program, designed to collect data from 11 emergency rooms, the Medical Examiner's Office, and Bureau of Vital Statistics from residents of 17 census tracts. Twenty area hospitals, 532 residents asked which hospitals they frequented for injuries; emergency records assessed and surveys to community health providers were done to come up with the 11 hospitals used for data. Cases defined by ICD-9 codes (International Classification of Injury Codes) and E-codes (external causes of injury codes). Data abstraction from medical records for fractures, location and severity of any fracture or injury using the AIS scale (Abbreviated Injury Scale). The first interview in the home was done by trained interviewers using unknown close-ended, standardized instruments (what instruments, validity/reliability?).

Variables: Sociodemographic data, chronic illnesses, self-reported hearing/visual deficits, functional status before and after the fall, whether such injury required hospitalization, change in household composition, pain duration, and activity limitations secondary to pain due to the fall. Second interviews were done with those with continued pain or activity limitation in 70 out of 84 participants meeting those criteria to find out level of current function, pain level, services utilized, and whether assistance was required of family members since the first interview. Poor recovery was determined by continuation of pain, reduction of activity levels or both due to the fall.

Findings: Most falls occurred in the morning, at home usually in the bedroom, with stairs coming in second as the most frequent place. Most fell from standing height, on wet or cluttered surfaces, with most people able to get up within 5 minutes. Hospitalization occurred in 31%, resulting in stays ranging from 1 to 192 days. Hip fractures were the most common, followed by leg or ankle, arm or shoulder. A total of 20 people either lost consciousness or could not tell if they lost consciousness as a result of the fall. By the time the first interview occurred, 43% had continued pain or activity restriction in activities such as ascending or descending stairs, walking, standing or bending. Fear occurred in most as a result of falling. Predictors of poor short-term recovery were: sociodemographics, prior functional status, severity, circumstances, chronic illness, having grandchildren in the home, hearing impairment, and leg injuries. Predictors of good recovery: having someone at home to help. Some had not recovered at the time of the first interview (41% of the 70 people interviewed) or had not seen a doctor since the emergency room and received help from PT, VNS, HHAs, Meals on Wheels; the majority (39%) had no one in particular, the remainder had either a physician or relative.

Limitations: Excluded were those not getting medical help outside the emergency departments, no independent assessment of disability level, only self-reports, so there is no validation that the pain and activity limitations they experienced were entirely due to the fall. Number of chronic illnesses were not predictors of poor fall recovery. Areas for further research: Why is there an association between grandchildren in the home and poor fall recovery? Would the sequelae of falls be different for White middle-class participants?

Grisso, J. A., Wishner, A. R., Schwarz, D. F., Weene, B. A., Holmes, J. H., & Sutton, R. L. (1991). A population-based study of injuries in inner-city women. *American Journal of Epidemiology*, *134*(1), 59-68.

Overview: Little is known about nonfatal injuries in African American women. The number of Black women who die in this population from homicide is greater than it is for White males. The Philadelphia Injury Prevention Program (PIPP) is an ED surveillance program that covers 17 census tracts in urban, primarily Black West Philadelphia from March 1, 1987-February 29, 1988. Researchers followed emergency room records of 11 hospitals utilized for injuries by members of this community to track cases International Classification of Disease, 9th revision (ICD-9) and Poisoning codes (E-codes). Quality controls used: 10% of the records re-abstracted by persons trained in quality control, with the goal of maintaining ascertainment >90% done 1 week/month. Cases were defined as falling into one of 33 categories listed according to ICD-9 codes.

Source: Empirical study, correlational study.

Aim: To study the pattern of injuries in these women during the study period.

Sample and Ethnicity: African American women in West Philadelphia age greater than 18.

Data Analysis: Rates per 1,000 women, individual event = numerator, denominator in intercensal estimates based on 1988 data/projections/actual counts. Time grouped into 6-hour categories using Chi-square to compare subgroups.

Results: Falls and violence were major causes of injury, highest rates among 25-34 year olds, nearly 3x that of age >65+. Little or no circumstances of injury were provided from the records, which gave information on those who sought care and not those who died or did not seek care. Results were surprising because they contrasted with information obtained from Northeastern Ohio Trauma Study, where fall risk was decreased for young adults, increased for older people. These results contrasted with common findings of greatest risk for falls with increasing age. Questions generated, such as: Why were fall rates so high in young women when it was expected to be the highest among the oldest?

Limitations: No sociodemographic data such as income and employment; more than half were not insured; no information on those who sought treatment at places other than the ED.

Gunn, H., Creanor, S., Marsden, J., & Freeman, J. (2014). Frequency, characteristics and consequences of falls in multiple sclerosis: Findings from a cohort study. *Archives of Physical Medicine and Rehabilitation, 95*(3), 538-545.

Aims: To observe fall and near-fall rate as well as circumstances and outcomes of falls and near-falls.

Source: A prospective cohort study.

Sample: N = 150; 2 participants did not record fall data as required and were eliminated from the final analysis. Participants were from the South West Impact of MS (SWIMS) study; they had a diagnosis of multiple sclerosis and an Expanded Disability Status Scale (EDSS) scale score of 3.5-6.5.

Ethnicity: Not specified.

Measures: Falls were recorded daily for 3 months. Fall data included time of day and injuries, rate of fatigue, and hurry. Near-fall data included the frequency of near-falls recorded daily for 3 months. Fall diaries were returned every 2 weeks, with participants reminded with a call if researchers failed to hear from them.

Findings: The return rate was 92.7%, with 823/888 possible fall diaries returned. A total of 104 out of 148 participants fell. A total of 672 falls occurred, fall rate of 18.41 falls PPY. Seventy percent of the sample fell at least once. Range of 1-63 falls over 3 months. A third of the sample fell between 2-5 times in the study period and 13 or 8.7% had more than 6 falls. Among near-falls, there were 3,785 near-fall events by 128 participants or 86%. Sixty-nine or 46.6% had more than 11 near-falls. Thirteen or 8.7% or the near-fallers reported more than 11 actual falls. Eighteen or 12% reported more than 11 near-fall episodes but less than 1 actual fall. Of 555 falls, most took place during the day during personal hygiene and were associated with general mobility. Fatigue was the cause of 27.8% of the falls. Of the 555 falls, 62 or 11.2% resulted in injuries.

Limitations: Small sample size, use of unsubstantiated information, no details of details of symptoms at the time of the fall.

Hafner, B. J., & Smith, D. G. (2009). Differences in function and safety between Medicare Functional Classification Level-2 and -3 transfemoral amputees and influence of prosthetic knee joint control. *Journal of Rehabilitation Research and Development, 46*, 417-434.

Aims: To examine the difference in function and safety in people with either passive or active mechanical-controlled prostheses; to examine outcomes in these people who were placed in groups based on Medicare Functional Classification and Level (MFCL) descriptors.

Source: A randomized, crossover experimental study with subjects serving as their own controls.

Sample: N = 17, with female N = 4, male N = 13, age 21-77 with unilateral, transfemoral amputation. Participants were amputees for a minimum of 2 years, were classified functionally as MFCL-2 or MFCL-3 and current users of well maintained, functional prosthetic limb with a passive control prosthetic knee.

Ethnicity: Not specified.

Intervention: Participants upon enrollment were fitted for a second prosthesis with an active prosthetic knee, to be used during the second month of the study. Participants started out in their passive control prosthesis, which they wore for 2 months, after which they returned and had functional assessments. After 2 months, participants transitioned to the active control prosthesis, which was worn 2 months before they received another functional assessment. After this time, participants were asked to return to using their passive control prosthesis for 2 weeks, after which they were to receive another functional assessment. Participants then entered an extended 12-month evaluation period, where they were instructed to use the prosthesis of their choice and return for functional assessments after 4, 8, and 12 months of extended use of the prosthesis of their choice.

Measures: Function on inclines using the Hill Assessment Index (HAI), function on stairs on the ordinal Stair Assessment Index (SAI), ability to navigate uneven terrain (walking speed on a 244-foot outdoor obstacle course), ambulation with attention demands (mean speed and accuracy on a verbal reverse-numbers test while walking two sides of a busy city block and answering to test questions), functional satisfaction and quality of life (QOL) using the PEQ self-assessment tool.

Findings: Mean functional outcomes while participants wore the active control prosthetic were greater than when they wore the passive control prosthetic for both the MFCL-2 and MFCL-3 groups. Subject satisfaction improved on average by 13 in the MFCL-2 participants and 21.7 in the MFCL-3 participants with the active control prosthesis (significant in the MFCL-3 group, $p < .002$). Only MCFL-2 group showed a decrease in uncontrolled (UC) falls, with frequency and number ($p = .01$) significantly improved in the group using the active control prosthesis. Participants were originally rated MFCL-2; by the end of the study, 50% were rated as MFCL-3 and 33% who were initially rated MFCL-3 were rated as MFCL-4.

Limitations: Small study sample size, no randomization of application of intervention or control for type of prosthetic knee.

Hanlon, J. T., Landerman, L. R., Fillenbaum, G. G., & Studenski, S. (2002). Falls in African American and White community-dwelling elderly residents. *The Journals of Gerontology: Series A, Biological Sciences and Medical Sciences, 57*, M473-8.

Aims: To study the effect of race on falls in the elderly and to determine whether race modifies the relationship among sociodemographics, health-related behaviors, vision, health, medication usage, and falls.

Source: A secondary data analysis of Duke Established Populations for Epidemiological Studies of the Elderly (EPESE), a 10-year prospective cohort study of community-dwelling elderly utilizing five urban and rural counties of North Carolina. A baseline interview was done, and 3 years later, a fall assessment was done for the prior 12 months. Original study used 4-stage, stratified household sampling.

Sample: N = 2,226 community-dwelling elderly; age = 72.3; females = 64%; education in years = 9.93; income = $13,201; rural residence = 44%.

Ethnicity: AAs = 1,049, Whites = 1,947

Measures: Falls (yes/no), 2+ falls in 12 months (yes/no). Independent variables include sociodemographics, BMI, health status: disabilities and diseases (modified 3-item Rosow-Breslau scale and self-reports); depression (CES-D); cognitive impairment (short portable Mini-Mental State Exam [MMSE]; upper/lower extremity function (adapted from Nagi, ranging from 0-5); reports of activity restrictions, visual function, and drugs used (self-reports).

Findings: 20.2% of African Americans and 23.2% of Whites fell at least once in the year; 45% of fallers had multiple falls. Old age, higher education, arthritis, diabetes, history of fracture increased fall risk with African Americans significantly less likely to fall. Factors associated with multiple falls: advanced age, education, arthritis, DM but race or history of fracture was not significant for multiple falls (contrary to findings of Nevitt, consistent with findings of Studenski).

Limitations: Nonproxy participants with complete drug and fall information; possible underestimation of falls; non-injurious falls not addressed; unable to include environment, assistive device usage, muscle strength; possibly not enough power to detect association with race and fall recurrence; sample may not be representative; falls not defined; reliability/validity of tools unaddressed.

Hausdorff, J. M., Doniger, G. M., Springer, S., Yogev, G., Simon, E. S., & Giladi, J. M. (2007). A common cognitive profile in elderly fallers and in patients with Parkinson’s disease: The prominence of impaired executive function and attention. *Experimental Aging Research, 32*, 411.

Aims: To compare cognitive function among elderly fallers, non-fallers as healthy controls and patients with Parkinson’s disease.

Source: A descriptive, correlational study with a single assessment.

Sample: N = 73 elderly men and women, with Parkinson’s Disease (PD) participants recruited from an outpatient movement disorder clinic and the non-Parkinson's patients recruited from the community. There were 18 fallers (67% female), 25 non-fallers (44% female), and 30 Parkinson’s disease participants (30% female).

Ethnicity: Not addressed, participants were Tel Aviv residents.

Measures: Computerized cognitive test battery in the same order; a calculated performance index used for timed tests. Tests included Bo-NoGo Response

Inhibition test; Verbal Memory; Stroop Interference test; Non-Verbal Memory; Finger Tapping; Catch Game; Staged Information Processing Speed test.

Findings: Fallers did more poorly than controls in executive function (p = .047), attention (p = .012), and motor skills (p = .013) but had similar performances in memory (p = .110) and information processing (p = .606) and Global Cognitive Score (p = .236). Fallers when compared to Parkinson's disease sufferers performed similarly in memory(p = .190); executive function (p = .957), attention (p = .626), information processing (p = .530), motor skills (p = .211), GCS (p = .968). Participants with PD performed more poorly than controls in executive function (p < .001), attention (p = .031), motor skills (p = .001), and GCS (p = .001), but with no memory impairment (p = .251) or information processing.

Limitations: Small sample size with fallers being older; researchers identified lack of power to distinguish certain group differences.

Heesch, K. C., Byles, J. E., & Brown, W. J. (2008). Prospective association between physical activity and falls in community-dwelling older women. *Journal of Epidemiology and Community Health, 62*, 421-426.

Aims: To examine the association between physical activity and the risk of falls and fractures.

Source: Prospective, observational study.

Sample: N = 8,188 women aged 70-75 via health surveys in 1996, 1999, and 2002 from the Medicare national health insurance database.

Ethnicity: Australian ethnicity, race unspecified.

Measures: Falls (defined) and injuries as a result of falls in the past 12 months; physical activity using two items from the National Heart Foundation of Australia and Australian Institute of Health; reliability/validity known but not provided. This instrument assessed the number of times/week the participant was involved in a minimum of 20 minutes of vigorous exercise and less vigorous exercise. Other measures were demographics (education, country of birth), medications for nerves and for sleep; leaking urine; number of stressful events in their lives over the past year (list of 24 items); number of chronic medical conditions (from a standard list); visual problems; years using hormone replacement; alcohol usage (the modified Hwalek-Sengstock Elder Abuse Screening Test); and body mass index (BMI).

Findings: Those who were very physically active had lower odds of a fall. Those with very high physical activity had lower odds of reporting a fracture versus those with very low physical activity.

Limitations: Data self-report; those remaining in the study may be healthier and better off sociodemographically than the general population, which was not described; men were not included and only those who did not suffer any serious injury were included.

Heesch, K. C., & Masse, L. C. (2004). Lack of time for physical activity: Perception or reality for African American and Hispanic women? *Women and Health, 39*(3), 45-62.

Overview: According to the National Health Interview Survey, African American and Hispanic women spend the lowest amount of time participating in leisure-time physical activity. Obesity rates are very high in the African American population (50.8%), putting them more at risk of developing chronic illnesses. Studies done in the past indicated that the self-reported barriers to starting and maintaining physical activity are: time, child care responsibilities, motivation and support, lack of facilities, concern for safety and accessibility, financial barriers, and other responsibilities.

Source: Empirical, correlational study.

Aims: To see if there was truly a lack of time or if the lack of time was perceived. By using diaries, researchers aimed to find out how African American and Hispanic women spent their time weekly, when they could incorporate leisure-time physical activity, and whether or not there was actual or perceived lack of time for leisure-time physical activity in their schedules.

Sample and Ethnicity: N = 254 minority women already enrolled in "Women on the Move," a study funded by NIH through the CDC. Inclusion criteria included age >40, literacy in English or Spanish, no health conditions that would make participation unsafe. They were recruited using flyers and presentations, radio and TV ads, word of mouth. They were screened for eligibility via phone or in person where they consented.

Methods: A total of five in-person meetings took place in which participants received instructions to fill out a one-day diary at time 1; a one-week diary was started at time 2 and completed by week 3/time 3. Time 4/week 9 participants completed a questionnaire assessing correlates of physical activity.

Variables: Demographics (age, race/ethnicity, employment status, household income, highest educational level achieved, primary language spoken), height, weight, BMI. Activity diary recording all activities lasting more than 10 minutes describing the activity, what type of activity (work, sport), how much effort was required, what position they were in while doing the activity (sitting, standing), and number of minutes spent on the activity. This diary was developed for the "Women on the Move" study. The activity was coded by two research assistants with a MET code and discrepancies between codes were decided by the principal investigator. Time perception assessed with three questions: Do you have time for PA? Are you too tired? Are too many responsibilities interfering with PA? (answer on a Likert scale ranging from 1-5, strongly agree to strongly disagree).

Statistical Analysis: T-tests: differences between the races for each activity for normally distributed variables; Chi-square: categorical variables that were severely skewed. Cohen's D: effect sizes needed. Why use phi coefficient as well? Chi-square test for independence for MET codes w/values <3. ANOVA: time commitment associated with perceived lack of time for categorical IVs and ANCOVA: to examine if covariants (categorical and continuous) impacted a/between time commitment and perceived lack of time.

Findings: Half of the participants were Hispanic, half AA. AA women had higher BMIs, higher level of education, made more money. Both sides spent equal amounts of time awake, mostly at work. Little time was spent on sports or exercise, free time doing religious activities, with the AA women spending more time working and less time doing household chores than the Hispanics. Both groups had about 28 hours of leisure time that could have been spent on PA, but was spent doing sedentary activities such as reading, talking on the telephone, watching TV, and napping. Only 23.4% of AA women and 45.6% of Hispanic women met national physical activity guidelines (p. 58).

Limitations: A small number of volunteer sample aged 40-72 who may not represent other AAs and Hispanics; those who were the busiest may not have had time to participate in the study; self-reports of activities depended on accuracy of reporting; early collection of diaries may have affected questions about perceptions, which may have changed by the end of the study when the assessment was done.

Hill, K., Schwartz, J. A., Kalogeropoulos, A. J., & Gibson, S. J. (1996). Fear of falling revisited. *Archives of Physical Medicine and Rehabilitation*, *77*, 1025-1029.

Aims: To examine the properties of the Modified Falls Efficacy Scale (MFES) in terms of scaling qualities, test-retest reliability, internal consistency, and other constructs, and to examine difference between participants in a Falls and Balance Clinic (FBC) and normal, healthy elderly using the Falls Efficacy Scale (FES) and the Modified Falls Efficacy Scale (MFES).

Source: Convenience sampling using two groups: healthy community-dwelling elderly and elderly from an FBC.

Sample: N = 179 with 71% from the FBC, average age 79.2 years and N = 86% from an FBC, average age 74. All were women.

Ethnicity: Not specified.

Measures: Reversed, extended FES with a visual analog scale ranging from 0-10, with 0 = not confident at all and 10 = completely confident; four added items include confidence rated on hanging out wash/gardening; stair usage at home; crossing roads and using public transport. Questions were posed by nurse/physiotherapist on initial assessment and a repeat test on a subgroup of 21 elderly (12 from the falls and balance clinic and 9 from the healthy community-dwelling elderly).

Findings: Cronbach's alpha for internal consistency on MFES was .95. Factor analysis found a 2-factor solution accounting for 75% of total variance. For indoor and outdoor activities, there was no significant effect for gender. There was a significant difference between health and falls and balance clinic participants with age as a covariate. Healthy elderly had minimum to no fear of falling (FOF), mean score 9.76 (SD.32) compared to 7.69 (SD2.21) for FBC. Range of scores for full sample was 0-10 for 10 items and 1-10 for the remaining items. Test-retest was .93.

Limitations: Small study sample size; participants in FBC were referrals and may not have been those at greatest risk of falling; convenience sampling; medication history of participants not known.

Hirsch, C., Anderson, M. L., Newman, A., Kop, W. J., Jackson, S., Gottdiener, J., Tracy, R., & Fried, L. P. (2006). The association of race with frailty: The Cardiovascular Health Study. *Annals of Epidemiology, 16*, 545-553.

Aims: To examine the association race has on frailty controlling for age, sex, socioeconomic status, and comorbidities.

Source: Using baseline data from the Cardiovascular Health Study (CHS).

Sample: Males and females aged >65 from four U.S. counties: Sacramento, CA; Allegheny, PA; Forsyth, NC; Washington, MD. N = 5,277.

Ethnicity: Whites = 4,491; African Americans = 786.

Measures: Personal characteristics (age, sex, race, and body mass index or BMI); socioeconomics (education, income); cognitive impairment (Mini-Mental State Exam score); assessed prevalent disease (coronary heart, congestive heart failure, hypertension, chronic obstructive pulmonary, diabetes, and arthritis); subclinical disease markers (ankle-arm index, maximum internal carotid wall thickness, presence of major abnormalities on ECG); inflammation markers (C-reactive protein, fibrinogen, albumin); physical function measures (IADLs, BADLs, upper extremity score or UES, difficulty walking half a mile).

Findings: For African Americans, 8.7% males and 15% females were frail compared to 4.6% White males and 6.8% White females. African American men and women were frailer than White men and women, particularly in the 65-74 age groups (3.4 men/3.6 women vs. 2.5 men/1.5 women). African Americans controlling for age and sex were: more impaired in instrumental activities of daily living (IADLs), lifting, reaching, gripping; were 2x as dependent in basic activities of daily living (BADLs) (11.4% vs. 5.4%), had 1.7x more difficulty with walking half a mile (29.5% vs. 17.5%). African Americans were more likely to have less than 12 years of education (49.5% vs. 31.1%, $p = .001$), incomes less than $12,000 vs. Whites (63.8% vs. 25.2%, $p < .001$). Non-obese African Americans were 4x more at risk for frailty than Whites regardless of sex. Nondisabled, nonobese African Americans of both sexes had the highest OR for frailty (7.7 and 6.6). Frail Whites were more likely to have IADL disability than frail African Americans (59.3% vs. 43.0%).

Limitations: Cross-sectional study design; selection bias; participants with missing data excluded from study results.

Holtzer, R., Friedman, R., Lipton, R. B., Xue, X., & Verghese, J. (2007). The relationship between cognitive functions and falls in aging. *Neuropsychology, 21*, 540.

Aim: To examine the relationship between cognition and falls in elderly patients without dementia or mild cognitive impairment (MCI).

Source: A cross-sectional examination of a population-based, longitudinal study.

Sample: N = 172 elderly (age >70), English-speaking, residing in the Bronx, NY, who were screened, enrolled, and followed via telephone. Participants were from the Einstein Aging Study (EAS) and were noninstitutionalized, without pre-existing dementia or sensory deficits that would interfere with them completing the neurological and psychological testing required of the study.

Ethnicity: Caucasians = 126; African Americans = 39; other = 7.

Measures: Neuropsychological tests of cognition, attention, memory, speed of processing, language, and executive function. These included: vocabulary (total score), information (total score), digit span (total forward/backward), digit symbol (total correct), block design (total score), subsets of the revised Wechsler Adult Intelligence Scale; Free and Cued Selective Reminding Test (FCSRT); Grober, Buschke, Crystal, Bang, and Dresner scale to test memory recall; the Boston Naming Test (BNT); letter fluency; category fluency; Trail Making Test (forms A and B). Falls: a self-report over the last year, with falls defined. Total disease score: clients were asked using structured interview for medical history for presence or absence of diabetes, chronic heart failure, arthritis, hypertension, depression, stroke, Parkinson's disease, chronic obstructive lung disease, angina, and myocardial infarction. Gait: observed, categorized as normal/abnormal, then further categorized as neurological/non-neurological. Quantitative gait: use of a 12-foot computerized gait mat with pressure sensors to determine velocity at normal speed.

Findings: Forty people fell, 25 were single falls, 15 recurrent falls. Three factors accounted for 61% of the variance on neuropsychological tests: Verbal IQ, Speed/Executive Attention and Memory. Speed/Executive Attention significantly related to single falls and any falls (OR = 0.518, 95%, CI = 0.304-0.884, P = .016 and OR = 0.495, 95%, CI = 0.314-0.779, p = .002). Speed/Executive Attention (OR = 0.339, 95%, CI =0.148-0.774, p = .010), Verbal IQ (OR = 0.213, 95%, CI = 0.081-0.562, p = .002), and disease comorbidity (OR = 2.698, 95%, CI = 1.271-5.724, p = .010) significantly related to recurrent falls.

Limitations: Cross-sectional nature of the study; since people with mild cognitive impairments and dementia were excluded, findings excluded a population at great risk of falling; self-report of falling as only method of finding out fall history so there is a potential for recall bias.

Horak, F. B. (2006). Postural orientation and equilibrium: What do we need to know about neural control of balance to prevent falls? *Age and Ageing*, *35*, ii7-ii11.

Aims: To enlighten clinicians on the multiple components involved in the maintenance of balance and coordination in the aging body.

Source: A clinical article.

Sample: Elderly males and females.

Ethnicity: Not specified, N/A.

Measures: The subcomponents of the postural control system.

Findings: Postural control is complex, involves interacting sensory and motor processes, with two goals: postural orientation (active control of the body) and postural equilibrium (coordination stabilizing center of mass). The aging process results in impaired muscular-skeletal, sensory systems, increasing risk of falls and injuries. Six components of postural control: biomechanical constraints, movement strategies, sensory strategies, orientation in space, control of dynamics, and cognitive processing. Biomechanical constraints: the base of support controls the center of mass and forms an imaginary upside-down cone. In old people, the cone is small and distorted. Movement strategies: three types, with two of them requiring the feet to stay put and the ankles to flex. The other involves torque at the hip, used when the ankle strategy is not appropriate. Elderly tend to use stepping, hip flexion more than younger people who tend to use ankle flexion to prevent falls. Sensory strategies: in circumstances when the base of support is stable and lighting is good, people use their senses in the following way: somatosensory (70%), visual (10%), vestibular (20%) senses. When the circumstances change, they are required to quickly redistribute their reliance on the senses. Elderly, especially those with diseases that affect the central nervous system, cannot do this, resulting in falls/injuries. Orientation in space: in normal, healthy people, the sense of being upright can be felt in the dark within 0.5 degrees. In elderly with changes in vestibular function, the internal sense of being upright is tilted and puts them at increased risk of falling. Cognitive processing: refers to the ability to do more than one task at a time and reaction times, both of which decline as a person with neurological impairments is made to multitask. Control of dynamics: refers to the ability of a person to maintain balance while changing postures/positions, tasks that become difficult for the elderly. Instabilities are context-related and individualized, requiring elderly to adapt individual strategies to prevent falls.

Limitations: Points made to identify what problems exist but not identify the actions that clinicians can take to intervene or prevent future problems.

Howland, J., Peterson, E. W., Levin, W. C., Fried, L., Pordon, D., & Bak, S. (1993). Fear of falling among the community-dwelling elderly. *Journal of Aging and Health*, *5,* 229-243.

Aims: To examine the prevalence, experiences, and factors associated with falls in community-dwelling elderly residents of Brookline and Plymouth, Massachusetts.

Source: A cross-sectional, correlational study.

Sample: N = 196 community-dwelling elderly with mean age 78; males = 19%, females = 81%; 12% married; 66% widowed; 85% residing alone.

Ethnicity: Not specified.

Measures: Demographics; activities of daily living; self-rated health; medications; walking aids; falls (how many times; injuries, and type of medical attention received; fear of falling (rated on a 4-point scale in relationship to violence against them; financial problems; forgetting appointments; loss of something cherished); did they avoid activities due to fear of falling.

Findings: Forty-three percent fell in the past few years, with 47% being males and 42% being females; 28% fell in the past year, with 65% of those falls resulting in injury. Forty-four percent needed medical attention, 15% hospitalization, and 20% of those were for broken bones. One-time fallers = 63%; 2-time fallers = 20%; and 3-time fallers = 17%. As the number and severity of falls increased, so did the percentage of people who were very or somewhat afraid. Self-rated health and prior fall experiences were significant for fear (p = .023 and .019). Fear of falling caused 35% to curtail activities; 26% felt they were likely to fall and injure themselves in the coming year, followed by being robbed in the street (17%).

Limitations: Researchers asked participants to rate their fear; no instrument used to assess fear of falling; sample may not be representative of the greater population, limiting the ability to generalize findings to other populations; small sample size.

Hyndman, D., Ashburn, A., & Stack, E. (2002). Fall events among people with stroke living in the community: Circumstances of falls and characteristics of fallers. *Archives of Physical Medicine and Rehabilitation, 83,* 165-170.

Aims: To examine stroke patients to determine whether circumstances and risks varied according to stroke onset and to compare fallers to non-fallers.

Source: A cross-sectional, observational study.

Sample: N = 41 community-dwelling men and women with a stroke. Males N = 26, females N = 15, mean age 69.6 +/- 11.6 years.

Ethnicity: Not specified.

Measures: Middlesex Elderly Assessment of Mental Status (MEAMS); use of adaptive equipment; medications; co-existing diseases; frequency, circumstances of falls and near falls (Fall Events Questionnaire); frequency, activity, falls in the past 12 months; frequency, location, activity, cause and preventive reactions to near falls; time, landing position, injuries, fear of falling; Nottingham Extended ADL (activities of daily living); Rivermead Motor Assessment of Upper Limb Activity (RMA); Hospital Anxiety and Depression Scale (HAD) assessed mood.

Findings: Twenty-one of 50% were classified as fallers, with 10 who were repeat fallers. Eighty percent of 32 experienced near falls and 5 had no falls or near falls. Repeat fallers' arm function and ADL ability were significantly reduced compared to those without reduced arm function and ADL reduction (p = 0.18, 95% CI, .96-12.24 and p = 0.10, 95% CI, 4.68-39.2). Repeat fallers had significantly higher depression scores than non-fallers with no near-falls (p < .05, 95and CI, -9.41 to -0.19). Majority of fallers landed sideways (62.8%), toward affected side on hands and knees. Near-falls were common, with 49 events reported and occurring during walking 27 times as well as during similar activities causing falls.

Limitations: Very small sample size; researchers noted that the instrument used to assess mood and mobility may have lacked sensitivity to detect small differences between subgroups.

James, J. K., Eldemire-Shearer, D., Gouldbourne, J., & Morris, C. (2007). Falls and fall prevention in the elderly: The Jamaican perspective. *West Indian Medical Journal, 56*, 534-539.

Aims: To gather information on falls, risk factors, characteristics of fall and outcomes; to examine the impact of falls on care delivery and costs; to examine the effect on policy.

Source: A review of the literature; a review of records of persons over age 60 attending Hermitage August Town Clinic from January 2004-September 2006; a review of case notes on chronic illness, vertigo, and trauma-related diagnoses in people over age 60 with a history of falls; a summary of four focus groups consisting of eight people.

Sample: N/A.

Ethnicity: Caribbean, no race specified.

Methods: Literature review; medical records of attendees of Hermitage August Town Clinic between January 2004-September 2006 review of records of elderly age >60 with a fall; review of case notes for diagnoses of vertigo, trauma, and chronic diseases in those with a fall history age >60; physiotherapist identified fall-related therapy visits between October 2005-September 2006; four focus groups of elderly age >60 on fall.

Findings: Identification of two seminal papers on this population in Jamaica in which authors highlighted falls took place at the home and most of admissions were due to trauma. Records reviewed revealed age range of fallers 61-82, mostly female, with primary diagnoses of vertigo, fractures, epilepsy, and various causes with injuries to lower limbs (52%) predominating. Comorbidities predominating were hypertension, diabetes, dementia, and no chronic illness. Injuries were lacerations requiring care (85%). Twenty-nine physiotherapy cases found identified similar results. Most patients (79.3%) experienced fracture with lower limb being mostly affected (48.2%) and upper limb (27.5%) in second place, and the home being the site of most accidents (52%). Direct cost included monies spent on care; indirect lost income, productivity, absence from work and disability, increased insurance premiums, beneficiary payments, pain and suffering, and fear of falling. Focus group causes emphasized poor lighting, street conditions, and designs of buses lacking support for holding on.

Limitations: Findings apply only to the Jamaican community and may not even be applicable to other parts of the Caribbean or Caribbean Americans living in the United States.

Janssen, H. C., Samson, M. M., & Verhaar, H. J. (2002). Vitamin D deficiency, muscle function and falls in elderly people. *The American Journal of Clinical Nutrition, 75*, 611-615.

Aims: To identify how deficiencies of Vitamin D impact the elderly.

Source: A narrative review and clinical article.

Sample: Elderly males and females.

Ethnicity: Not specified.

Findings: Some of the most common reasons elderly are at risk of Vitamin D deficiency include low intake through diet, sunlight, thinness of the skin, poor absorption via the intestines, altered liver and kidney hydroxylation with proximal muscle (type II fibers) atrophy. With the assistance of the sun, vitamin 7-dehydroxycholesterol converts to Vitamin D3 (cholecalciferol), then to 1 alpha, 25 dihydroxyVitamin D3 [1, 25 (O) D3], which is the active form of Vitamin D. In the elderly, levels of the active form of the vitamin <30 mmol/L were associated with low leg extension power. Levels <40 mmol/L were associated with decreased handgrip and walking distance. Authors cited a small study of 10 elderly women with levels <10 mmol/L and found that when these women were treated for 6 months with 0.5 mcg of alpha calcidiol/d, they had better knee extension and walking distance. Among the frail elderly (males and females), improvements were seen in dressing times and functional ability. For those with adequate levels of the vitamin, no association between concentration of the vitamin and knee strength, even though both diminished with age. Vitamin D impacted postural balance, walking, weight-bearing muscles of the lower limbs; was associated with falls in elderly. Authors cited a study of 148 women with calcium levels <50 mmol/L who were supplemented with calcium and Vitamin D, resulting in reduction in body sway and falls. Another cited study: the 3-year STOP/IT (Sites Testing Osteoporosis Prevention and Intervention Treatments) trial of 489 women who randomly were assigned to estrogen, calcitriol, both or a placebo. There those on calcitriol had fewer falls and fractures than those on estrogen, better balance, and lower extremity strength.

Limitations: No description of the criteria used in the choice of the studies used in the review.

Keith, J. N., Nicholls, J., Reed, A., Kafer, K., & Miller, G. D. (2011). The prevalence of self-reported lactose intolerance and the consumption of dairy foods among African American adults are less than expected. *Journal of the National Medical Association, 103*, 36-45.

Aims: To examine the incidence of lactose intolerance and how lactose intolerance influences food choices in the African American community.

Source: An online, self-reported study using 12 questions.

Sample: N = 3,100 people using a matching the 2000 Census from May 2003-June 2003.

Ethnicity: African American N = 2,016; nationally representative general population N = 1,084.

Measures: Dairy consumption, physical symptoms associated with dairy consumption, management of symptoms associated with lactose intolerance, dietary changes made to minimize symptoms.

Findings: Between 30-50 million Americans are lactose-intolerant. For African Americans, past studies indicated that 70-80% suffer from lactose intolerance and consume far less than the recommended daily allowances of dairy products. In this study, 49% of Blacks experienced some physical discomforts after consuming dairy products and only 24% identified themselves as having lactose intolerance. Based on previous studies done by the National Health and Nutrition Examination Survey (NHANES), mean calcium intake for African American males and females was 623 mg/day and 514 mg/day. For non-African American males and females, it was 964 mg/day and 740 mg/day. Total dairy intake in servings/day for African American males and females was 0.86 and 0.73. For non-African American males and females, it was 1.78 and 1.39.

Limitations: Data was self-report only, with no other validation of results; this was a cross-sectional survey and not a longitudinal study.

Kempen, G. I. J. M, & VanEijk, L. M. (1995). The psychometric properties of the SSL12-I, a short scale for measuring social support in the elderly. *Social Indicators Research, 35*, 303-312.

Overview: The SSL12-I is a 12-item tool measuring social support in the elderly population. It is short version of the Social Support List of Interactions, which was originally 34 items, known as SSL-I.

Variables: This tool is described as assessing everyday support, support in problem situations, and esteem support (self-esteem and approval).

Sample and ethnicity: N = 5,356 community-based, Netherlands residents aged 57 and older, with MMSE >16.

Findings: The SSL12-I is an acceptable, satisfactory psychomotor assessment tool that may be useful in a younger population as well.

Kempen, G. I., van Haastregt, J. C., McKee, K. J., Delbaere, K., & Zijlstra, G. A. (2009). Sociodemographic, health-related, and psychosocial correlates of fear of falling and avoidance of activity in community-living older persons who avoid activity due to fear of falling. *BMC Public Health, 9*, 170.

Overview: Fear of falling is common in the elderly population. The prevalence in noninstitutionalized is 20-over 60%; the prevalence of fear of falling and activity avoidance in the noninstitutionalized elderly population is between 15-over 55%. These phenomena can lead to functional decline, decreased socialization, decreased quality of life, increased risk of falling, and institutionalization. Most prior studies focused on sociodemographic and health-related factors associated while few incorporated potential covariants such as psychosocial variables; few differentiated between severe and mild levels of fear of falling and activity avoidance.

Source: Cross-sectional, correlational study.

Aims: To examine the relationship between levels of fear of falling and activity avoidance and an extended range of sociodemographic, health-related, and psychosocial correlates.

Sample and Ethnicity: 540 non-institutionalized elderly, age >70, with a minimum of mild fear of falling and activity avoidance.

Variables and Instruments: Sociodemographics included age, sex, and educational level, number of professional courses completed (no tools, all via self-report). Health-related assessment included limitations in ADLs (11-item subscale of the Groningen Activities Restriction Scale); visual and hearing impairment (2 items, Organization for Economic Cooperation and Development); perceived general health (MOS-SF 20 with score ranging from poor to excellent); number of chronic conditions (a checklist of 19 conditions used by the Dutch National Office of Statistics); cognitive function (25-item Dutch version of the Telephone Interview for Cognitive Status or TICS); fall history (a single question asking “How many times have you fallen in the past 6 months?”). Psychosocial variants included general self-efficacy (16 questions from the General Self-Efficacy questionnaire); mastery (7 items from the Mastery Scale); social support (12 items from the Social Support for Interactions Scale), loneliness (“How many times in the past 4 weeks do you feel anxiety?”; no tool); anxiety and depression (14 items from the Hospital Anxiety and Depression Scale).

Findings: Independent correlates of severe fear of falling were being a female, having activity limitations, having one or more falls in the past 6 months. Independent correlates for severe avoidance of activity were advanced age and limitations in ADLs. Psychosocial variables did not contribute independently to the difference between mild and severe fear of falling or to the difference between mild and severe activity limitations.

Limitations: Cross-sectional design; had the study been done in the United States and on population-based samples, the results may have been different. There was no explanation of the tools, the reason for choosing them, or a description of their validity and reliability and what the scoring meant.

Take-home Points: Does not focus on elderly African Americans.

Kiely, D. K., Cupples, L. A., & Lipsitz, L. A. (2009). Validation and comparison of two frailty indexes: The MOBILIZE Boston Study. *Journal of the American Geriatrics Society, 57*, 1532-1539.

Aim: To validate and compare two frailty indexes in a sample of African Americans; to examine executive function across frailty levels.

Source: A prospective observational study.

Sample: N = 765 community-dwelling elderly, age >70 from the Maintenance of Balance Independent Living, Intellect, and Zest in the Elderly (MOBILIZE) Boston Study (MBS).

Ethnicity: White 596 (78%); African American 121 (15.8%); Asian 10 (1.3%); American Indian 4 (0.5%); Multiracial 17 (2.2%); Other 16 (2.1%).

Measures: Cardiovascular Health Study (CHS) frailty index and Study of Osteoporotic Fractures (SOF) frailty index as predictor variables in this study. Outcome variables are recurrent falls (fall calendars); hospitalization and emergency room visits; Short Physical Performance Battery (SPPB); activities of daily living and instrumental activities of daily living; disability; chronic illnesses (yes/no); self-rated health (SRH) on a scale of 1-5, with 1 indicating very good and 5 indicating poor; cognition assessed with Hopkins Verbal Learning Test-Revised (HVLT-R), phonetic and semantic fluency, Trail Making Parts A and B, Clock in a Box Test.

Findings: The SOF classified 77.1% as robust, 18.7% as prefrail, and 4.2% as frail. The CHS classified 51.2% as robust, 38.8% as prefrail, and 10% as frail.

Limitations: Findings may be limited to community-dwelling elderly; mortality not addressed as an outcome; self-report of outcomes only.

Kressig, R. W., Wolf, S. L., Sattin, R. W., O'Grady, M., Greenspan, A., Curns, A., & Kutner, M. (2001). Associations of demographic, functional, and behavioral characteristics with activity-related fear of falling among older adults transitioning to frailty. *Journal of the American Geriatrics Society, 49*, 1456-1462.

Aims: To explore and report the prevalence of fear of falling (FOF) and associated factors such as demographics, functional and behavioral characteristics seen in elders transitioning to frailty; to provide baseline information to measure the impact of an intervention on activity-related fear of falls and covariates.

Source: A cross-sectional analysis of baseline data from a randomized, controlled, single-blind interventional study.

Sample: N = 287 men and women, age >70, with Mini-Mental State Exam (MMSE) scores >24, from 20 independent senior living facilities, ambulatory with or without as assistive device, without cognitive impairment with a mean age of 80.9 years, range 70-98 without severe physical or unstable conditions prohibiting them from participating in the intervention to follow.

Ethnicity: Caucasian N = 232 or 80.8%; African American N = 50 or 17.4%; Other N = 5 or 1.7%.

Intervention/Control: Tai Chi training twice weekly for a total of 48 weeks was the intervention. The control was an educational program for falls, behavioral, functional, and biomechanical measures. All participants were followed for an additional year, with trained evaluators interviewing patients and assessing abilities.

Measures: FES (Falls Efficacy Scale), ABC (Activities-Specific Confidence Scale), and CES-D (Center for Epidemiological Studies Depression Questionnaire). Functional assessments: single limb stand, 360 turn, picking up an object, 3-chair stands, 10-meter walk, functional reach test.

Findings: A twofold increase among African Americans in risk of fear of falling using ABC, but not FES when other factors were controlled. Researchers were unable to understand the reasons for this finding (perhaps a topic for further research), despite the fact that their answers to questions about falls efficacy were similar to other respondents. Ten percent were fearful on one scale but not the other. Statistically significant inverse correlation between FES and ABC scores found. Depressed were more than twice as likely to have fear of falling (FOF) compared to those not depressed. Nonfearful elderly had significantly greater gait speeds. Users of walking aids had a three-/fourfold increase in fear of falling. Impaired gait/balance, depression, disability of lower extremities were significantly associated with FOF, with 50% of elderly transitioning to frailty fearful of falling.

Limitations: The sample may not be representative, so findings may not be generalized to all elders transitioning to frailty. Those participating may have better health or motivation to pursue better health. Given the small sample of African Americans in this study (fewer than 20%), interpretation of the findings should be done with caution. The transitional phase needed further description and clarification. Notably absent were definitions of constructs, tools' validity/reliability.

Kulmala, J., Viljanen, A., Sipila, S., Pajala, S., Parssinen, O., Kauppinen, M., Koskenvuo, M., Kaprio, J., & Rantanen, T. (2009). Poor vision accompanied with other sensory impairments as a predictor of falls in older women. *Age and Ageing, 38*, 19-24.

Aims: To examine the effect visual impediments have on fall risk; to examine the effect visual, sensory, and balance impairments have on fall incidence.

Source: A prospective, nonexperimental design.

Sample: N = 428 women aged 63-76, ambulatory 2 kilometers, able to travel independently to the research lab where the measures were taken. These women were part of the Finnish Twin Study on Aging (FFITSA), where the sample was treated as a set and analysis was adjusted for within-pair dependence.

Ethnicity: Finnish.

Measures: Visual acuity in lab with or without the aid of glasses using illuminated Landolt ring chart with normal vision specified; audiometrics using a clinical audiometer in a soundproof booth with Madsen OB822 and THD39 headphones with hearing impairment specified; postural balance using Good Balance force platform measurement system with the poorest tertile classified as having balance impairment and cutoff values given; falls defined and followed up using calendars mailed at the end of each month; chronic illnesses, medications, Mini-Mental State Exam (MMSE), height, weight, body mass index (BMI).

Findings: Two hundred twenty-seven had no falls, 201 falling with 440 fall events. No significant difference between fallers and non-fallers in age, MMSE, medications, chronic illnesses, hearing or velocity movement. Adjusting for age and interdependence of twins, those with visual impairment only had slight, nonsignificant increase in risk of falls compared to those with good visual acuity (IRR 1.5, 95% CI 0.6-4.2). Those with visual impairment and poor standing balance were 2.7 times more at risk for falls during 1-year follow-up (95% CI 0.9-8.0). Those with visual and hearing impairments were 4.2 times more at risk of falling. Vision, hearing, and balance impairment increased the risk of falls by 29.4 (95%, CI 5.8-148.3).

Limitations: Sample was relatively healthy and young, with a small percentage having severe visual impairment; data were unavailable on surgery or eye-related issues during follow-up; wide confidence intervals.

Lach, H. W. (2005). Incidence and risk factors for developing fear of falling in older adults. *Public Health Nursing (Boston, Mass.), 22*, 45-52.

Aims: Extend prior work to longitudinally examine changes in fear of falling in men and women to identify risk factors for developing fear of falling.

Sample: N = 600 in final sample, a probability sample stratified by age and gender into four age groups: 65-69, 70-74, 75-79, 80 and above.

Source: A prospective, cohort study with yearly follow-up from St. Louis OASIS, a longitudinal, community-based project.

Ethnicity: Not specified.

Measures: Demographics, health status (self-rated, no tool, range from poor to excellent), medications, cognitive function, anxiety, fear of falling (no tool), risk factors for falls, fear of falling (question, no tool), depression (Geriatric Depression Scale; no reliability or validity, no description of scoring), cognition (Short Blessed Test, Trail Making B test; no description of the tool or what its scoring means).

Findings: Three risk factors identified associated with fear of falling: worse perceived health status (1.72 times more likely to report fear of falling), unsteady gait (1.88 times more likely to report fear of falling) and having two or more falls in the past (4 times more likely to report fear of falling). Regarding prevalence of fear of falling: increased in general over the 2 years of the study. Increasing age, especially among the two oldest groups, was associated with prevalence and incidence of falls. Overall, 56.2% were fearful at some point, 17% were always fearful; of those who had not fallen, 18% were fearful; 18% changed from fearful to not fearful at wave 4, then 4.5% reverted to being fearful at wave 4.

Limitations: Fear of falling was measured as a single, self-reported item and no tools were used; more comprehensive measurements of variables such as activities of daily living (ADLs) could have been used; because this is a secondary data analysis, there was no way to go and assess from the participants themselves other items that may have been needed to answer the research questions further. Not population-specific, but findings helpful to all race and ethnic groups.

Lach, H. W., Reed, A. T., Arfken, C. L., Miller, J. P., Paige, G. D., Birge, S. J., & Peck, W. A. (1991). Falls in the elderly: Reliability of a classification system. *Journal of the American Geriatrics Society*, *39*, 197-202.

Aims: To develop and test a fall classification system using two reviewers and structured interviews and narrative to classify falls.

Source: A 3-year prospective study of falls.

Sample: N = 1,358, community-dwelling elderly, age >65.

Ethnicity: General population.

Measures: Categories of falls as falls related to extrinsic factors, falls related to intrinsic factors, falls related to non-bipedal stance, falls not classified.

Findings: Independent classification of 366 falls occurring in the first year of the study into four major categories: falls related to intrinsic factors (55%), extrinsic factors (39%), non-bipedal stance (8%), and unclassified (7%). Interrater reliability 89.9% and kappa of 0.828.

Limitations: Deals with the general population and not specific for African Americans, but the information is beneficial to both races.

Lee, C., Almagor, O., Dunlop, D. D., Chadha, A. B., Manzi, S., Spies, S., & Ramsey-Goldman, R. (2007). Association between African American race/ethnicity and low bone mineral density in women with systemic lupus erythematosus. *Arthritis Care and Research, 57*, 585-592.

Aims: To examine the relationships among osteoporosis risk factors, African American race, systemic lupus erythematosus (SLE).

Source: A cross-sectional, correlational study with participants recruited from the Chicago Lupus Database and the Pittsburgh Lupus Registry from 1996-2002.

Sample: N = 298 women.

Ethnicity: Non-Hispanic Whites and African Americans.

Measures: Osteoporosis risk factors (age, menopause, lifestyle); medications (hormones, supplements to calcium and Vitamin D, osteoporosis medications, diuretics, and antieleptics); duration of SLE; cumulative disease damage (Systemic Lupus Damage Index); history and duration of renal involvement (1982 ACR classification criteria for SLE); bone mineral density (BMD), measurement of hip and lumbar spine (DXA).

Findings: Seventy-seven were African American. African American women were younger at SLE diagnosis and at study visit; had higher body mass index (BMI), used less alcohol (0.8 gms/day versus 2.7 gms/day) and caffeine (69.9 mg/day versus 110.4 mg/day) compared to Whites; had lower proportion on hormones; had lower daily calcium (957.3 mg/day versus 1,274.8 mg/day) and Vitamin D (135.1 IU/day versus 208.1 IU/day) intake. African American women had significantly greater cumulative disease damage (1.0 versus 0). African American women had lower bone mineral density at the hip and spine compared to White women, with African American race being strongly associated in lower bone mineral density at the lumbar spine (unadjusted OR 4.9, 95% CI, 2.37, 7.15) and remained low after adjusting for significant factors for low BMD.

Limitations: Cross-sectional design, there is no picture that can be looked at across time to see trends and patterns.

Lee, P. G., Cigolle, C., & Blaum, C. (2009). The co-occurrence of chronic diseases and geriatric syndromes: The health and retirement study. *Journal of American Geriatrics Society*, *57*, 511-516.

Aims: An investigation of the co-occurrence of geriatric syndromes and falls in the elderly.

Source: Secondary data analysis of the 2004 wave of the Health and Retirement Study (HRS).

Sample: N = 11,113 representing 37.1 million elderly aged >75 in America from the 2004 wave of the HRS (Health and Retirement Study). Age 65-75 (55%), >76 (45%); female (58%); married (56%); education grade 12 and above (72%); net worth (majority or 28% >$420,000); majority live with others (67%).

Ethnicity: Whites (87%); Hispanics (5%); African Americans (8%).

Measures: A physician diagnosis of coronary artery disease (CAD), congestive heart failure (CHF), diabetes (DM), and urinary incontinence (UI); falls (report of two or more or any fall with injury requiring medical attention in the past year). Independent variables: age, sex, race, marital status, living situation, net worth, and education.

Findings: Those with more conditions, older, female, single, living alone or in a nursing home, with less education and lower net worth. No association between number of conditions and race. The most prevalent condition was UI (25%) followed by falls (23.2%). CHF had the most substantial burden of co-occurring conditions (80+ %). More than 25% with any of the three chronic illnesses had at least two geriatric syndromes. Sixty-four percent of those without any of the three diseases had neither geriatric syndrome.

Limitations: Cross-sectional study, self-reports, other diseases not assessed or analyzed.

Lee, J. S., Kwok, T., Leung, P. C., & Woo, J. (2006). Medical illnesses are more important than medications as risk factors of falls in older community dwellers? A cross-sectional study. *Age and Ageing, 35*, 246-251.

Aims: To determine which whether chronic illness or medications were more important as risk factors in falls among elderly.

Source: A cross-sectional, retrospective study.

Sample: N = 4,000 community-dwelling males and females aged >65. Males N = 2,000, females N = 2,000 who are residents in an urban community in Hong Kong.

Ethnicity: No Blacks in this study; only Hong Kong residents.

Measures: Outcome variable was falls in the past year. Covariates were demographics, socioeconomic status, smoking/alcohol usage, daily physical activity, cognition, medical history, current medications, height, weight, stride length. Self-rated health was the predictor variable.

Findings: At least one fall was reported in 789/4,000 participants (19.7%) in the previous year, with 235/4,000 (5.9%) having more than one fall. Aspirin, calcium channel blockers, antidiabetics, nitrates, nonsteroidal anti-inflammatory drugs (NSAIDS), and statins were associated with increased risk of recurrent falls. Aspirin, antidiabetics, nitrates, NSAIDS, and paracetamol were associated with increased risk of any number of falls. Psychotropic drugs were not significantly associated with any or recurrent falls. Only nitrate showed bordering significance with any falls (OR 1.489, $p = 0.027$). Being female, having heart disease, shorter stride length were associated with falls history ($p < 0.005$). Eye disease moderately associated with falls in the nitrates model ($p = 0.009$). Antidiabetics showed moderate association with recurrent falls. Conditions associated with recurring falls were diabetes, eye diseases, heart diseases, lower body musculoskeletal pain, self-rated health, and average stride length. All of the above were associated with any falls in the previous year with the addition of stroke.

Limitations: Association between psychotropic medications and falls probably not found due to the small number of people in this sample taking these drugs. Falls assessment based on recall; nonexperimental design; relatively healthy and mobile sample.

Legters, K. (2002). Fear of falling. *Physical Therapy, 82*, 264-272.

Aims: To examine the status of knowledge of fear of falling.

Source: A literature review.

Sample: N/A.

Ethnicity: Not specified.

Findings: Out of 5 instruments listed to assess falls efficacy, 2 had no reliability at the time of this writing (the Modified Falls Efficacy Scale and Balance Self-Perceptions Test); 4 of the 5 had no fall-risk threshold scores. Of 4 instruments for assessment of fear of falling, 3 had no reliability (Perceived Control Over Falling, Perceived Ability to Manage Falls and Falling, Survey of Activities and Fear of Falling in the Elderly) at the time of this paper. Many factors are associated with fear of falling, but the exact cause is unknown. Multifactorial interventions have been used to address the multiple factors associated with fear, with mixed findings on their effectiveness. Many studies focused on physical change such as physical environment and increasing physical strength and balance instead of behavioral change.

Limitations: Fear of falling mostly studied using cross-sectional studies; more creative sampling means needed; reliability/validity of instruments not available on some instruments used to assess this variable.

Li, F., Harmer, P., Fisher, K. J., McAuley, E., Chaumeton, N., Eckstrom, E., & Wilson, N. L. (2005). Tai Chi and fall reductions in older adults: A randomized controlled trial. *The Journals of Gerontology: Series A, Biological Sciences and Medical Sciences*, *60*, 187-194.

Aims: To examine the effects of Tai Chi in fall prevention over 6 months; to assess functional ability, fear of falling, and whether or not any improvements can be attributed to the program were sustained over time.

Source: Randomized, controlled trial with repeated measures at baseline, 3, 6, 12 months. Tai Chi vs. stretching (control group).

Sample: N = 256; from Legacy Health System; 77.4 years of age, primarily female, White, with a high school education or more; most with fear of falling. A total of 68 participants were lost by study end, resulting in a 26.5% dropout rate.

Ethnicity: Whites N = 232.

Intervention: Tai Chi classes using Yang style each class an hour, given 3x/week for 26 consecutive weeks by experienced instructors with music during classes. The controls received seated exercises, stretching, controlled breathing, and relaxation in a weekly format identical to that of the intervention.

Measures: Falls (defined as well as injurious falls and measured with calendars); functional balance (BBS, DGI, FR, SLS, 50-feet walk, Up and Go); fear or falls (the Survey of Activities and of Fear of Falling in the Elderly or SAFFE). No validity/reliability provided. Independent variables include demographics, health conditions, use of CAM, overnight stays, and use of medical professionals.

Findings: Significantly fewer falls at the end of 6 months in the Tai Chi group vs. stretching group. Tai Chi group had fewer medical care visits from injurious falls vs. controls. Tai Chi group had significantly reduced risk for multiple falls when adjusting for covariates (0.45 with 95% CI, 0.30 to 0.70, $p < .001$). Intervention benefits were improved balance measures, physical performance, and lower fear of falling mean score vs. stretching group. At 6 months: significant group x time interaction in balance, performance, fear of falling.

Limitations: Not a blind study, assessors were aware of some participants status; frail not included; high dropout rate.

Lin, S. I., & Woollacott, M. (2005). Association between sensorimotor function and functional and reactive balance control in the elderly. *Age and Ageing, 34*, 358-363.

Aims: To examine the association between balance control and sensorimotor functioning.

Source: A cross-sectional study.

Sample: N = 16 young females compared to N = 65 independent community-dwelling, older females. Mean age of the young females was 24.9 years. Mean age of stable older adults was 73.5 years and mean age of functionally unstable older adults was 76.2 years. Those not eligible included those with neurological disorders, musculoskeletal problems or pain, those with lower extremity joint replacements, those with diabetes, those with peripheral neuropathies, and those with uncontrolled hypertension.

Ethnicity: Not addressed in this study.

Measures: Functional balance (Berg Balance Test and Dynamic Gait); muscle strength of hip flexors and extensors, muscle strength of the knee and ankle; sensory evaluation (normal or delayed).

Findings: Functionally unstable older adults had significantly lower Berg Balance Test scores compared to young and stable older adults ($p < 0.001$). Functionally unstable older adults had lower strength than the other two groups in all muscles. Postural responses to unexpected movements or perturbations of the center of mass were automatic. Elderly experienced age-related changes in posture in which center of mass leans forward, changing their ability to react to surface changes resulting in multiple steps in a less effective manner, increasing fall risk.

Limitations: Cross-sectional nature of the study gets only a snapshot of data at one point in time rather than following subjects for patterns of data; those excluded from the study are the ones at the greatest risk of falling.

Ling, S. M., & Bathon, J. M. (1998). Osteoarthritis in older adults. *Journal of the American Geriatrics Society, 46*, 216-225.

Aims: To examine the effect of osteoarthritis (OA) in terms of falls and injuries in the elderly population and to examine current and future treatment modalities.

Source: A critical, narrative literature review for a clinical journal.

Sample: Elderly population in the United States.

Ethnicity: Not specified.

Measures: None.

Findings: OA is chronic, prevalent condition in the elderly that results in pain and loss of function and independence. OA affects distal and proximal interphalangeal joints, knees, and hips. Women affected by hand OA, polyarticular OA, and isolated knee; men affected mostly at hips. Obesity creates pain, especially in the knees. Competing study results on occupation-related repetitive injury. Explanations on the pathology: due to cartilage matrix degradation, chondrocytes with reduced functional density, matrix metalloproteinase (MMPs) which further degrade cartilage, excess interleukin-1 and reduced interleukin-1 receptor antagonists. Symptoms: increased joint pain with movement and after prolonged rest, locking of the weight-bearing joints, stiffness, prominence, crepitus, decreased range of motion, osteophytes on radiography (late sign), elevated serum hyaluronic levels, and cartilage oligomeric protein (COMP) levels in synovial fluid. Pharmacological treatment: nonsteroidal anti-inflammatory drugs; risk of gastrointestinal bleeding 4.2-5.5x increased risk, risk of kidney failure; may use with misoprostol or esomeprazole. Topicals such as capsaicin and methyl salicylate; periarticular or intra-articular glucocorticoid injections. Nonpharmacological: orthotics to absorb shock, low-impact, gravity-limiting exercises. Surgical: arthroscopy, osteotomy, and arthroplasty. Future treatments: new nonsteroidal anti-inflammatory drugs (NSAIDs) with fewer GI and renal side effects; medications to suppress cartilage degradation and increase cartilage repair; medications/therapies to extracellular cartilage matrix; potential for transplantation of healthy autologous chondrocytes.

Limitations: No criteria on inclusion/exclusion criteria for this review.

Liu-Ambrose, T., Davis, J. C., Nagamatsu, L. S., Hsu, C. L., Katarynych, L. A., & Khan, K. M. (2010). Changes in executive functions and self-efficacy are independently associated with improved gait speed in older women. *BMC Geriatrics*, *19*, 10.

Aims: To examine the association of executive function and falls to self-efficacy and gait speed.

Source: An examination of the results of a secondary data analysis of a 12-month randomized, controlled trial of two groups. One group received 1x/week or 2x/week resistance training; the other group 2x/week balancing and toning exercises on cognitive executive functioning.

Sample: N = 135 females aged 65-75, independently living, with a Mini-Mental State Exam score >24.

Ethnicity: Not specified.

Measures: Global cognition (MMSE); depression (Geriatric Depression Scale); gait speed; dominant quadriceps strength (string gauge); set shifting (Trail Making Tests A and B); working memory (verbal digits forward and backward); selective attention and conflict resolution (Stroop Test); fall-related self-efficacy (ABC test).

Findings: Changes in selective attention, conflict resolution, and falls efficacy significantly associated with increased gait speed. Twenty-four percent of the total variance explained in linear regression model which included age, baseline gait speed, global cognition, change in quadriceps strength. A 7-kilogram increase in dominant quad strength, a 9-second increase in Stroop Test and Trail Making Tests, a 1.2% increase in ABC score and increase in gait speed by .22m/second.

Limitations: The use of independent, community-dwelling females without physical or cognitive impairments or significant fall history; those at greatest risk of falling not included in this study.

MacRae, P. G., Lacourse, M., & Moldavon, R. (1992). Physical performance measures that predict faller status in community-dwelling older adults. *The Journal of Orthopaedic and Sports Physical Therapy, 16*, 123-128.

Aims: To assess the value of the use of clinical measures in predicting faller status in community-dwelling elderly.

Source: A cross-sectional, correlational study.

Sample: N = 94, ages 60-89, mean 73.2. Females = 65; males = 29. Independent-living Los Angeles elderly residents who participated in activities in the community center and who could walk without assistance.

Ethnicity: No mention.

Measures: Health (height, weight, blood pressure); health status; history of illness; current medications; faller status (questionnaire on falls in the past year including how, when, where); Single Leg Stand (timed, maximum 30 seconds); Sit to Stand (10 full stands no hands); Manual Muscle Test (hand-held dynamometer); Response Speed (finger press apparatus).

Findings: Six variables were statistically significant discriminating predictors of fallers vs. non-fallers. Those were: MMT of the ankle dorsiflexors, knee flexors, hip abductors, knee extensors, time on one-legged stand test (OLST), and single-legged stand test (SLS) tests. Sixty-six or 70.2% of participants were classified as non-fallers, while 28 or 29.7% fell at least once in the past year and were classified as fallers. Findings suggested that loss of strength and coordination in movement can result in falls.

Limitations: Small sample size; relatively healthy sample that excludes those with difficulty ambulating and therefore at greatest risk of falling; no mention of ethnicity or other factors that may need consideration as affecting the outcome variables; associations can only be made due to the nature of the study.

Mansfield, A., Peters, A. L., Liu, B. A., & Maki, B. E. (2010). Effect of a perturbation-based balance training program on compensatory stepping and grasping reactions in older adults: A randomized controlled trial. *Physical Therapy, 90*, 476-491.

Aims: To examine whether a perturbation-based balance training program has an effect on compensatory stepping and balance.

Source: A double-blind, randomized, controlled trial with repeated measures done 1 week before training and 1 week after program completion.

Sample: N = 30; community-dwelling elderly age 64-80 reporting worsening balance, a fall or near fall in the past 5 years. Excluded were the sensory, motor, and cognitively impaired; those with medications that may cause dizziness; those at risk of injury and with conditions limiting physical abilities.

Ethnicity: Not specified.

Measures: Frequency of multiple steps, extralateral steps, and foot collisions, handrail contact time. Those randomized to control received passive muscular relaxation exercises 1 day/week, flexibility exercises 2 days/week. The intervention involved stepping and grasping reactions from the unpredictable movements of a handrail-equipped platform. All groups were under supervision of trained personnel.

Findings: The perturbation-based group had decreased multistep reactions, but findings were significant in surface translations; decreased frequency of trials in which foot collisions occurred; decreased handrail contact time.

Limitations: Small sample size; exclusion of the people most likely to benefit from the study and most likely to fall.

Masud, T., & Morris, R. O. (2001). Epidemiology of falls. *Age and Ageing, 30*, 7.

Aims: To classify and define falls and fallers; to reveal the circumstances and consequences of falls among the elderly.

Source: A narrative literature review.

Sample: This is not a study but the population being described

Ethnicity: Whites.

Measures: No measures.

Findings: Falls defined as unexpected change in position from vertical to horizontal. Falls classified as explained (some intrinsic or extrinsic cause) or unexplained. Falls can be classified as injurious or noninjurious. Fallers defined as having at least one fall within a specified time period. Recurrent fallers have had two or more falls within a specified time period. Risks for falling were categorized as skeletal or nonskeletal in nature. Skeletal causes of falls are related to bone structure, genetics, height, weight, mobility, and general health. Nonskeletal causes are related to vision, cognition, neuromuscular function, medications, and fall mechanics. Consequences of falls include 40-60% resulting in injuries; 5% fractures and 1% hip fractures.

Eighty percent of women prefer death over hip fracture, loss of independence, and possible institutionalization. Forty percent of fall-related injuries result in institutionalization.

Limitations: White women were the focus; no mention of the impact of falls and injuries on the ethnic community except one mention that the fall rates were similar among different races; the benchmark for articles included in this review was not addressed.

McCormick, D. P., Ponder, S. W., Fawcett, H. D., & Palmer, J. L. (1991). Spinal bone mineral density in 335 normal and obese children and adolescents: Evidence for ethnic and sex differences. *Journal of Bone and Mineral Research, 6*(5), 507-513.

Aims: To observe factors associated with skeletal mineralization in children and adolescents.

Source: A cross-sectional study.

Sample: N = 151; 77 females and 74 males.

Ethnicity: Whites = 66, Blacks = 49, Hispanics = 36.

Measures: Age, ethnic group, socioeconomic background, medical history, height, weight with clothes but without shoes, mean triceps skinfold thickness (mm) and mid-arm circumference (cm) on the right arm to get an average of three measures, weight and height percentiles, fat-free density, arm muscle area body mass index (BMI), and ratio of weight to height calculated. Bone mineral density from lumbar 2, 3, and 4 using a Lunar DP3.

Findings: There were ethnic group differences but no differences in gender. For example, 38 African American children were compared to 77 White children under the age of 10. The mean Z score was 0.41949, $p = 0.0223$. Bone mineral density index (BMDI) which is bone mineral density (BMD) divided by weight was found to be more sensitive an indicator than BMD alone. In the end, African American children had more BMD than White or Hispanic children and females more than males.

Limitations: Cross-sectional design limited the ability of the researcher to state that these results would have been obtained at another time or in another environment. Those who were excluded, including those with chronic illnesses, those with metabolic bone diseases, and those whose weight was less than the 5th percentile, probably would have been those persons whose presence would have caused a different result. Small sample size may limit the ability to generalize findings.

McMichael, K. A., Vander Bilt, J., Lavery, L., Rodriguez, E., & Ganguli, M. (2008). Simple balance and mobility tests can assess falls risk when cognition is impaired. *Geriatric Nursing, 59*, 311-323.

Aims: To test the hypothesis that Romberg and GUG test scores would be associated with falls risk after adjustments for confounders in a sample with and without cognitive impairment.

Source: A clinical, epidemiological study.

Sample: N = 358 community-dwelling, primary care patients aged >65 who were 15 primary care providers from Southwestern Pennsylvania. Excluded were those who were unable to provide consent. Mean age 77.5, with a range of 65-95 years; females = 246 or 68%, high school education and greater N = 239 or 68%.

Ethnicity: No information provided on ethnicity.

Measures: Outcome variables were self-reported falls at the previous year, at baseline and at two annual assessments. Predictor variable was self-rated health reported on a scale of 1-5. Primary explanatory variables were the Romberg test and Get Up and Go (GUG) test. Covariates were age, sex, education, Mini-Mental State Exam (MMSE) Score, and number of regularly taken prescription medications.

Findings: In cross-sectional analyses and adjusting for age, sex, education, and self-rated health, abnormal GUG and Romberg tests were significantly associated with concurrent falls. In longitudinal analyses and adjusting for falls at baseline, sex, age, education, and self-rated health, abnormal GUG significantly predicted future falls, but abnormal baseline Romberg test did not. Both tests were abnormal in a higher proportion of participants with cognitive impairment or MMSE scores <25 than among those with normal MMSE scores (23.7% vs. 10.1%, Chi-square 5.11, p = .02 among 246 non-fallers). Those on four or more medications were at greater falls risk than those taking fewer medications.

Limitations: Sample were primary care patients who received home assessments and were primarily Whites, and findings may not be applicable to other types of populations or ethnic groups. Researchers used the nontimed version of GUG and focused on completion rather than time of completion of the task. Self-report of falls was the only means of assessing falls.

Means, K. M., O'Sullivan, P. S., & Rodell, D. E. (2000). Balance, mobility, and falls among elderly African American women. *American Journal of Physical Medicine and Rehabilitation/Association of Academic Physiatrists, 79*, 30-39.

Aims: To determine fall history; measure balance, mobility, and fall-related characteristics in African American women; and compare findings to a comparative group of elderly White women and identify variables that may predict balance and mobility comparatively between these groups of women.

Source: An observational study.

Sample: N = 298 females, non-nursing home inhabitants, age 77.9 years, primarily widows (73%), able to walk minimum of 30 feet with or without use of an assistive device but without aid of another person, able to understand instructions and consent, and have no acute medical problems with nonhistory of hospitalization in the past month.

Ethnicity: Black and White participants: Whites (N = 180) and Blacks (N = 118). Participants recruited from the Central Arkansas Area Agency on Aging, which serves the diverse population and operates 17 senior centers in apartments and in the community.

Measures: Body mass index (BMI), symptoms or sum of balance dysfunction symptoms; activity (if activity of daily living score is high, elderly need great assistance); neurological status (mental status, Romberg, neuro score, Romberg tests summed), reflex (upper/lower limbs summed); ROM (three joints measured bilaterally); strength (selected muscle groups rated, summed). Demographic and clinical variables, fall history over the past year via self-report, FOC (12 simulations of ADLs at home, recorded), Tinetti Index (14 balance and 10 gait items, scored), postural Sway (eyes open, eyes open and visual, eyes closed over 20 seconds).

Findings: African Americans took fewer medications, reported lower physical activity levels, and had significantly higher BMIs; had lower muscle strength, higher neurological abnormalities, and were not statistically significant, but had more abnormal reflexes; FOC time was 40 seconds slower than Whites and had worse quality scores, had greater postural sway on 1 out of 3 measures. The fall history was similar, but despite having scores on indicators that should have put the Black women at higher risk for falls due to balance and mobility, this was not so as they did not have higher fall rates than their White counterparts. Significant predictors of obstacle course performance for Whites: activity levels, neurological abnormalities, and muscle strength; for African Americans, predictors were activity level, neurological abnormalities, and ROM.

Limitations: Multiple analysis of data, increasing the rate of type 1 error; no access to participants' charts and only went by the medications reported, which could be either what they chose to take, were able to afford, or could remember. They were limited by size of the sample, overall good health of the participants, their memory, and selection of the sample. Other limitations noted were due to design: this was a nonexperimental study with no treatment, no control group, and no randomization. Participants self-selected to be in the study and were likely more motivated and may not be typical of the population from which they came, making findings not generalized.

Means, K. M., Rodell, D. E., & O'Sullivan, P. S. (2005). Balance, mobility, and falls among community-dwelling elderly persons: Effects of a rehabilitation exercise program. *American Journal of Physical Medicine and Rehabilitation/Association of Academic Physiatrists, 84*, 238-250.

Aims: To investigate the effects of a rehabilitation/exercise intervention on balance and mobility in community-dwelling elderly.

Source: A single-blind (participants only), prospective, randomized, controlled trial with repeated measures (baseline, 6 weeks, and 6 months).

Sample: N = 338; control = 157 (59 fallers, 98 non-fallers); intervention = 181 (fallers = 80, non-fallers = 101); females = 57%.

Ethnicity: Whites = 89%.

Measures: Outcome measures: functional obstacle course (FOC); range of motion (ROM), strength, activity, symptoms; falls/injuries. Functional Obstacle Course (FOC) taped after instructions, an instructor-led walk-through. ROM: scoring from 0-10 with 0 = normal and 10 = limited; hip abduction/adduction, hip flexion/extension, knee flexion/extension, ankle plantar flexion/dorsiflexion, ankle eversion. Strength: range 0-5 with 0 = no movement and 5 = normal strength with bilateral use of the above muscle groups. Activity: amount of assistance, frequency of walking, ability to leave the home and distance traveled, self-rating from 0-3 with 0 = active/independent, 1 = mild restriction, 2 = moderate restriction/physical inactivity, and 3 = severe restrictions. Symptoms: presence/absence of vertigo, dizziness, syncope, general weakness, fatigue, pain, visual problems, lower limb weakness; yes = 1, no = 0. Falls: self-report, description, number of fall-related injuries as defined. Intervention group: 6 weeks of physical therapist-led stretching, coordination, strengthening, endurance, postural control exercises in a group setting. Control group: 6 weeks of seminars on topics interesting to seniors in a group setting.

Findings: Fallers performed poorer vs. non-fallers. Intervention group: 244 seconds on FOC at baseline, postintervention 226 seconds, 6 months later 224 seconds. Control group: 235 seconds at baseline, 226 seconds postintervention, 6 months later 227 seconds. Quality of the FOC: intervention improved by 2.1% over baseline; the control group improved their score by 0.3% over baseline. Among those in the intervention group who were fallers, 87% reported no falls in the 6-month follow-up. Among the controls who were fallers, it was 34.5%; 10/29 reporters of falls had no falls. Among those in the exercise/rehab group who reported injuries in the past 6 months, 26/29 (89.7%) had no injuries in the 6-month follow-up. Among controls, 55.6% or 10/18 reported fall-related injuries.

Limitations: High attrition rate limits ability to generalize; those people who were excluded were the most likely to fall and benefit from the rehabilitation/exercise intervention.

Merriam-Webster Online. (2011). *Merriam-Webster Online Dictionary and Thesaurus.* Retrieved January 1, 2011, from http://www.merriam-webster.com/

Aims: To provide standardized definitions of terms used in the research process.

Source: An online dictionary and thesaurus.

Sample: N/A.

Ethnicity: N/A.

Measures: N/A.

Findings: Provides insight, understanding, and definitions for the researcher and reader using universally accepted and understood terms.

Limitations: N/A.

Miller, D. K., Lui, L. Y., Perry, H. M., 3rd, Kaiser, F. E., & Morley, J. E. (1999). Reported and measured physical functioning in older inner-city diabetic African Americans. *The Journals of Gerontology. Series A, Biological Sciences and Medical Sciences, 54*(5), M230-6.

Aims: To examine the effect that diabetes has on falls and functional status on a sample of inner-city African Americans in north St. Louis; what anthropomorphic, emotional, cognitive, physical functioning factors may explain differences between diabetics and nondiabetics?

Overview: There is a higher incidence of diabetes in African Americans than Whites, but there are considerable gaps in research studies on AA diabetics since most of the research is done on middle-age Whites with the disease. As diabetics age, the incidence of falls secondary to peripheral neuropathies increases.

Sample and Ethnicity: Community-dwelling African American/Black, age >70, 416 recruited using random sampling frame utilized by HCFA (Health Care Financing Administration) lists; 230 from senior citizens centers N = 638; 116 self-reported diabetics ages >70 and 522 nondiabetics. What happened to the eight remaining participants? Inclusion criteria: community-dwelling with residency within the 5-mile catchment area of north St. Louis. A random sampling frame utilized by HCFA recruited 416 participants; the remainder were recruited from senior centers and apartment buildings. What is diabetes? Diabetes meant diabetic if seniors self-reported, were taking anti-hypoglycemic or fit a definition provided to them. What is sugar diabetes? The criteria were unclear in the information provided, although it referenced albumin-corrected fructosamine but did not describe any further. Participants were asked whether they had one or the other. What is the standardized, accepted definition of either of these conditions?

Variables and Instruments: Medications used, whether they were prescription or over the counter. Age, health rating based on EPESE (Established Populations for the Epidemiologic Studies of the Elderly) tool/question, fall history over the past 3 months assessed using the Tinnetti and coworkers tool. Modified Rosov-Breslau

scale used to score how well they performed ADLs, BADLs; the Katz scale and the Lawton and Brody scale, the modified Stanford Health Assessment Questionnaire by Pincus et al. Physical examination included: BMI, waist circumference, foot and ankle assessment, vibration time via tuning fork, grip strength using Jamar dynamometer, upper and lower body strength using methods of Kendal et al.; balance using POAM (Performance Oriented Assessment of Mobility) scale; Timed Up and Go test, the 7-item Physical Performance Test of Reuben and Siu; whether they ever had a heart attack, chest pain or angina) standard chemistries. Three items from the Modified Stanford Health Assessment Questionnaire rating independence on a scale from 1 (needing personal assistance) to 3 (unable to perform the task even with help).

Methods: With trained research assistants, participants and primary caregivers were interviewed using a standardized protocol (not described). Strength and balance tests were done on 168 people (91 random sampling frame, 77 groups) and blood tests were done on 173 people (146 received strength and balance assessments and 27 did not). For increased rigor, the chief investigators always performed half the measurements and without knowledge of diabetic status for those in the strength and balance evaluation.

Findings/Conclusions: Diabetics were slightly younger, had more medical problems and were on more medications, were at greater risk for MI/angina, drank less, had foot/ankle ulcers, sensory deficits. Most were not obese, had poorer self-rated health, and had more fears of falling than their nondiabetic counterparts. This study confirmed findings from studies in other diabetic populations. There were more functional disabilities in the diabetic group, especially in higher-level functioning than lower-level functioning, more injurious falls than the nondiabetic control group.

Limitations: Please see above.

Miller, D. K., Morrison, M. J., Blair, S. D., Miller, J. P., & Morley, J. E. (1998). Predilection for frailty remedial strategies among black and white seniors. *Southern Medical Journal, 91*(4), 375-380.

Overview: Exercise is very important. At the time, no studies on exercise preferences, type of therapy, or locational preferences in minorities.

Aims: To examine the effect sex, race, recruitment site, functional status, participation, fear of falling, and history of falls had on predilection for frailty prevention. What is frailty? Subjects recruited from four pools: a community health clinic made up of primarily African Americans, an urban housing unit made up primarily of low-income and disabled young people, a university-based clinic utilized by African American and White elders of all sociodemographic groups, and a racially-mixed retirement community.

Source: Comparative, noninterventional study.

Sample and Ethnicity: Black/African-American or White, age >60, able and willing to answer questions, no evidence of dementia. N = 359, 88 Black/African Americans from the community-based health clinic; 154 from the university-based clinic (56 Black/African American, 97 White, 1 other), 80 from the urban public housing (78 Black/African American, 2 White), 36 from the retirement community (33 White, 1 other, 1 Refused to answer, 1 Black/African American).

Variables/Instruments: Questionnaire on what was their preference among six types of exercise. Choices: walking, dancing, sink-based exercises, weight lifting, movement and balance, and stretching. Participants were asked their preference regarding location: home, outside in a building or outdoors? Participants were asked: what type of dance, either modern or African? What type of therapy: hormones or vitamins? What form: either pills daily or injections monthly? Other data collected: age, sex, fear or falling, number of falls in the last year. Participants were assessed for functional level using a tool designed by Siu et al. (not explained, no information regarding reliability/validity). Those with the lowest functional level were assigned scores of 1; those with the highest level of functioning were assigned scores of 7. Information was collected via face-to-face interview with everyone except the retirement center people; they gave information via questionnaire and by filling out such a questionnaire, consent was implied. Other participants did face-to-face interviews with trained interviewers, who obtained their written consent.

Findings: Stretching, sink-based exercises, walking and movement, and balance were preferred in that order by participants in general. Other generalities: exercise at home, alone with few interested in dance, and even fewer interested in African music to dance to. Men had equal preferences regarding location, had somewhat more interest in hormones and injections than women. Women preferred to exercise in the home, preferred vitamins to hormones and pills rather than injections. Blacks/African Americans preferred sink-based exercises, outside the home, in groups and African dance, were less favorable toward injections or hormones. Those in the university-based clinics preferred “preventive strategies” although they did not say what those were. Less-functional participants wanted more weight lifting than higher-functioning participants. Those with a history of falls were least willing to exercise.

Limitations: The researchers used a convenience sample so all the problems associated with convenience sampling held true here. They further admitted that their questionnaire assessed attitudes or beliefs and not actual behaviors or actions. They did not advise the participants of the risks of participation in exercise programs and admitted there would be difficulty implementing a program with the number of variables given; used non-standardized tools.

Miller, D. K., Wolinsky, F. D., Andresen, E. M., Malmstrom, T. K., & Miller, J. P. (2008). Adverse outcomes and correlates of change in the Short Physical Performance Battery over 36 months in the African American health project. *The Journals of Gerontology: Series A, Biological Sciences and Medical Sciences, 63,* 487-494.

Aims: To determine the ability of the Short Physical Performance Battery (SPPB) to detect subclinical disability in African Americans measured in falls, hip fracture disability, institutionalization, and mortality.

Sample: N = 998 from St. Louis, Missouri, aged 49-65 from the AAH (African American Health) project, a population-based random sample from a suburb northwest of St. Louis and an inner-city neighborhood. Baseline interviews were done in the home between September 2000 and July 2001 by trained interviewers during wave 4; then 36 months after baseline again in the home.

Ethnicity: African Americans.

Measures: Age, gender, disease status, vision, poor self-rated health, weight, smoking, and inactivity, symptoms of depression, undesirable neighborhood, and recent hospitalization. Researchers examined vital statistics (deaths), NH placement, hospitalization, physician visits, activities of daily living (ADLs) and instrumental activities of daily living (IADLs) using LSOA-II and Lawton. No descriptions of these tools were given; they had to be looked up. The tool itself measures performance on three lower-body physical performances, standing balance, chair stands, and usual gait speeds. Researchers examined the relationship between the score obtained at baseline and outcomes at 36 months by using a survey organization. Other tools used in this study: CES-D (depression); MMSE and animal naming test (cognition); FES (FOF); Getzer Institute Working Group (religiosity); YPAS (Yale Physical Activity Scale measures activity). No information on validity or reliability of these tools was given. Other measures via self-report included: demographics, presence of disease, race consciousness, neighborhood desirability, neighborhood assessment, and use of health services.

Findings: As SPPB score increased, there was a relative decrease in risk of death, NH placement, and hospitalization. Changes in SPPB score from high to low over time was associated with falls efficacy, comfortable income, age, poor vision, diabetes, refusal to report income, Medicaid, BMI >30, and hospitalization a year before baseline and kidney disease.

Limitations: No information on the validity and reliability of the tools, all instruments had to be researched; age range, single area may not be generalized to other populations.

Miller, D. K., Wolinsky, F. D., Malmstrom, T. K., Andresen, E. M., & Miller, J. P. (2005). Inner-city, middle-aged African Americans have excess frank and subclinical disability. *The Journals of Gerontology: Series A, Biological Sciences and Medical Sciences*, *60*(2), 207-212.

Aims: To compare frank and subclinical disability of this population to national data for community-dwelling nonHispanic Whites and community-dwelling African Americans.

Source: A comparative, descriptive study.

Sample: Probability sampling was used to obtain participants from two catchment areas. The areas compared were: a poor inner-city area used in a prior study of elderly disabled, and a suburb northwest of St. Louis, born between January 1936 and December 1950, able to score a 16 or better on the Mini-Mental State Examination and give informed consent; N = 998. The comparison group was made up of people from the HRS (Health and Retirement Study), a prospective, nationally representative sample of NHW's study of people born between the years 1936-1947 that used similar questioning and methodologies about functional status that AAH used.

Ethnicity: Participants had to be Black/African American.

Measures: Frank disability was assessed by the ability or inability of participants to perform seven basic ADLs, 8 IADLs, Nagi physical performance test measuring 4 upper-body tasks and 5 lower-body tasks. The subclinical ADLs were assessed using 3 basic ADLs, 3 IADLs, and the Rosow-Breslau test. (Authors did not state the sensitivity/specificity or reliability/validity information on these tests.)

Findings: Women were more likely to have frank disability and more subclinical disability than men. The inner-city group had more frank disabilities than the suburban group all around. The inner-city group had more subclinical disabilities than the suburban group in all tasks except meal preparation. Inner-city participants were most likely older, poorer, and lived alone. The inner-city sample had more frank disability than the national Black or NHWs.

Limitations: The sample was not representative of the entire Missouri metropolitan population; its sample of African Americans was not representative of African Americans in other urban areas, making the findings difficult to generalize. The authors found difficulty with the wording of the AAH disability questions; the way they were worded may have affected some findings. However, they felt that although the wording was not identical, it was the most comparable tool for use with their data. They also found difficulty finding data sets asking similar disability questions of residents of poorer, inner-city areas that were similar to those they asked.

Miller, R. G., Ashar, B. H., Cohen, J., Camp, M., Coombs, C., Johnson, E., & Schneyer, C. R. (2005). Disparities in osteoporosis screening between at-risk African-American and white women. *Journal of General Internal Medicine, 20*, 847-851.

Aims: To compare the screening prevalence for osteoporosis in African American and White women at risk for osteoporosis.

Source: Cross-sectional study.

Sample: N = 205 females at risk for osteoporosis, age >65, weight <127 who had at least one outpatient clinic visit between January and December 2000. The two clinics were an academic urban hospital and a suburban community hospital.

Ethnicity: African American N = 103, White N = 102, with African American participants slightly older but not different on any other measures.

Measurements: Demographics, risk factors such as weight, smoking, heavy alcohol usage >3 drinks/day, family history of osteoporosis, history of hip or vertebral fracture; medications increasing risk of osteoporosis such as glucocorticoids, anticonvulsants, diseases such as hyperthyroidism, hyperparathyroidism; use of calcium, Vitamin D, bisphosphonates, raloxefene, calcitonin; physician demographics such as age, gender, race, hospital affiliation, type (resident or internist).

Findings: African Americans were less likely to be taking supplements or hormone therapy, had fewer spine compression injuries, were less likely to have osteoporosis mentioned as a possibility in documentation. There was no difference in the odds of completion of DXA scanning in African Americans and Whites. Due to low number of African American practitioners, researchers were unable to use race as a physician factor. For all other physician factors, the odds of DXA referral were lower for African American women. Despite all factors, the odds of having DXA referral were lower for African American women with risk factors.

Limitations: Retrospective chart review without patient or practitioner contact; reliance solely on accuracy of documentation in the chart; no patient matching to comorbidities; may be unable to generalize findings to other areas.

Mudano, A., Casebeer, L., Patino, F., Weissman, N., Kiefe, C., Person, S., Gilbert, D., & Saag, K. (2003). Racial disparities in osteoporosis prevention in a managed care population. *Southern Medical Journal, 96*, 445-451.

Aims: To study differences in osteoporosis care in Black and White women enrolled in a large Health Management Organization (HMO).

Source: A correlational, comparative study with a medication assessment.

Sample: N = 8,909.

Ethnicity: Black and White women aged 50 and older.

Measures: Risks using Simple Calculated Osteoporosis Risk Estimation evaluation. This instrument measured BMD (bone mineral density) in the past 2 years; usage (past/present) of estrogen replacement therapy (ERT), bisphosphonates, calcitonin and/or raloxifene usage; past/present nonprescription medication usage of medications that may be of use in osteoporosis management such as supplements; race, weight, fracture history, gynecological history, steroid use, smoking, and exercise. Other variables included type of insurance (Medicare Choice or other insurance) and median household income (zip code and county of residence as determinants).

Findings: Blacks were significantly older (22%), had higher body weight, lower household income and were most likely to be on Medicare, had lower prednisone and cigarette use, were more likely to have had oophorectomy, had 2/3 lower odds of BMD or prescription treatment for osteoporosis, had nearly 50% lower odds of BMD compared to Whites; had significantly lower odds of using OTC calcium and Vitamin D even with a past history of fracture. Significantly fewer Blacks: received bone mineral density (BMD) testing (68 or 14%) compared to Whites (713 or 28%); received prescriptions (191 or 38% compared to 1,713 or 67%). Despite adjustments for confounding factors, Blacks were 50-65% less likely to get BMD or treatment.

Limitations: Data obtained via self-report, low response rate, possible selection bias (responders had higher income level which may indicate a greater concern about their health), lack of information available about osteoporosis knowledge, health beliefs and racial concordance between provider and patient.

Mukamal, K. J., Mittleman, M. A., Longstreth, W., Jr., Newman, A. B., Fried, L. P., & Siscovick, D. S. (2004). Self-reported alcohol consumption and falls in older adults: Cross-sectional and longitudinal analyses of the Cardiovascular Health Study. *Journal of the American Geriatrics Society, 52*(7), 1174-1179.

Overview: Prior studies on alcohol consumption and fall risk in elderly adults yielded inconsistent results. Alcohol consumption may cause increased risk in elderly due to imbalance after acute ingestion; has been associated with increased ventricular size, evident on brain MRIs, a form of atrophy associated with diminished lower extremity function, balance, and cognition. Alcohol was associated with peripheral neuropathy, skeletal myopathy, postural hypotension. All the preceding were linked to falls.

Questions: Would cross-sectional analysis show no or an inverse relationship between alcohol consumption and falls? Would a longitudinal analysis show that with increased alcohol use there is higher fall risk? Researchers hypothesized that inconsistent study results were secondary to previous emphasis on cross-sectional studies.

Source: Cross-sectional and longitudinal.

Sample and Ethnicity: N = 5,841: African Americans = 687; Whites = 5,201. Age >65, Medicare, residents of 4 communities: Forsyth County, NC; Sacramento, CA; Washington County, MD; Allegheny County, PA. Non-institutionalized, able to consent, no wheelchairs, cancer treatments, expected to live in the region minimum of 3 years. Excluded: missing baseline information on alcohol intake or falls.

Methods: Questionnaire, physical exam, labs, gait speed, maximum grip with follow-up every 6 months from 1989-1994; cranial MRI total 3,660 from 1992-1994.

Variables and Instruments: Alcohol consumption (self-report), falls (self-report), demographics (self-report), health status (self-report), CES-D (measure of depression no validity or reliability), orthostatic (may vary with qualifications of measurer, no description of tools used to assess), physical activity (self-report), brain MRI, psychoactive medications, MMSE (tool no information on validity/reliability), 15-minute walk time.

Statistics: ANOVA relationship between baseline alcohol consumption and clinical characteristics, Chi-square for categorical variables; logistic regression: controlling for confounders, cross-sectional analysis using fall frequency as outcome prospectively; Cox proportional hazards regression controlled for confounders. Analysis stratified for race, sex, physical function.

Findings: Cross-sectionally, inverse relationship between consumption and falls at baseline, similar in both races, limited smaller numbers in stratified analysis. Longitudinally, no difference between abstainers and light/moderate drinkers <14 drinks/week in fall risk. Drinkers of 14 or more drinks/week had significantly higher fall risk than abstainers. Possible mediators adjusted for orthostatics both increased and decreased with similar associations in stratified analysis. No interactions on participants younger or older than 75.

Limitations: CHS participants healthier secondary to entry criteria, which were not defined; measure of falls different at follow-up; falls were self-reported at annual clinic visits, first fallers with fatalities may have been misclassified; circumstances of falls not available, detailed drinking patterns not available.

Murphy, S. L., Dubin, J. A., & Gill, T. M. (2003). The development of fear of falling among community-living older women: Predisposing factors and subsequent fall events. *Journal of Gerontology and Biological Science Medicine, 10*, M943-M947.

Aims: To examine factors predisposing elderly to being fearful of falling and to evaluate fall events and the effect on the development of this fear.

Source: A repeated measures correlational study.

Sample: Females age >72, community-dwelling residents of New Haven, CT.

Ethnicity: Not specified.

Measures: Fear of falling (yes/no); age (80 years/older); self-report of chronic illnesses (myocardial infarction, stroke, cancer, diabetes, previous hip fracture or any fractures after age 50, Parkinson’s disease, amputations, arthritis); fall history in the past year; medications; near vision (Rosenbaum card); chronic dizziness (past 2 months, lasting a minimum of 1 month); cognition (Mini-Mental State Exam); gait (20-foot observation); balance (steadiness during standing maneuvers); activities of daily living or ADLs (Katz index); IADLs (self-report of housework, home repair, and driving); sedentary life (participation in sports, stretching exercises); anxiety (Spielberger State Trait Anxiety Index); depression (Center for Epidemiologic Study Depression Scale); instrumental/emotional support (having someone to talk about problems/decisions); subsequent fall events (validated fall calendar).

Findings: Subsequent falls were experienced by 77 (25%), with 84 (27%) developing fear of falling. Factors associated with fear of falling ($p < .05$) were chronic dizziness, impaired balance/gait, sedentary lifestyle, anxiety, and no emotional support. Subsequent fallers developed fear (39%) vs. persons without subsequent falls (23%). Those who fell 1 or more times prior to baseline or who fell at the 1-year follow-up were at greater risk of developing fear of falling vs. those without a fall history or subsequent fall (35% vs. 20%; $p = .004$).

Limitations: Method of assessing fear may lack sensitivity and was not a predictor of behavior; use of only one measure of fear of falling.

My-ms.org. (2012). *Epidemiology of neurological conditions and diseases.* Retrieved June/15, 2012, from http://www.my-ms.org/ce_epidemiology.html

Aims: To educate the practitioner and the public on multiple sclerosis; to identify those at greatest risk and some of the neurological conditions that affect those with multiple sclerosis; to describe how the condition manifests in Blacks and Whites.

Source: A nonprofit website.

Sample: Not a study; addressed all those with multiple sclerosis.

Ethnicity: Discusses the differences in the manifestations seen in Blacks compared to Whites.

Measures: Disease pattern in the population.

Findings: Blacks may have lower occurrence of the disease, but they have greater disability, increased spinal cord, optic nerve, and cognitive degeneration compared to Whites. Blacks are diagnosed at a younger age because of the rapid onset of symptom, have a shorter duration of the disease despite no significant difference in the length or type of treatment. Among Black Africans the disease is rare, but is seen in American Blacks possibly due to environment (diet, smoking) and due to racial integration. No real numbers on number of Blacks affected, possibly due to decreased participation in clinical trials, but they are at risk possibly due to existence of another autoimmune disease and female gender. Despite this information, the disease is still found in greater numbers of Whites than Blacks. It is estimated that 250,000 people have this disease.

Limitations: Methods of funding of the original study are not known; original sources of information may not be known; unknown validation of findings.

Nair, R., & Maseeh, A. (2012). Vitamin D: The "sunshine" vitamin. *Journal of Pharmacology and Pharmacotherapeutics, 3*(2), 118-126.

Aims: To observe the prevalence of Vitamin D deficiency, to observe the role Vitamin D plays in the maintenance of healthy bones, to note the people at high risk of deficiency, to examine some sources of Vitamin D, and to see the role Vitamin D plays in other diseases/conditions of the body.

Source: A non-systematic review of the literature.

Sample: N/A; this was not a study.

Ethnicity: N/A.

Measures: Vitamin D recommendations and upper levels for those who are deficient were given.

Findings: Those people at greatest risk of deficiency are infants fed solely breast milk, those who are elderly and/or spend limited time outdoors, those with dark skin (melanin interferes with the skin's ability to produce Vitamin D from the sun), those who have had gastric bypass or have malabsorption diseases such as Chron's or cystic fibrosis, and those on certain medications such as steroids. Adequate intake of Vitamin D may play a role in muscle strength, thereby decreasing falls in the elderly. Vitamin D may play a role in decreasing risk in patients with colon cancer, hypertension, heart disease, obesity, type 2 diabetes, depression, cognitive impairment, bacterial vaginitis, pelvic floor disorders, and influenza.

Limitations: N/A; this was not a study.

Nasreddine, Z. S., Phillips, N. A., Bedirian, V., Charnonneau, S., Whitehead, V., Collin, I., Cummings, J. L., & Chertkow, H. (2005). The Montreal Cognitive Assessment, MoCA: A brief screening tool for mild cognitive impairment. *Journal of American Geriatrics Society, 53*.

Aims: To develop and test the Montreal Cognitive Assessment (MoCA) in patients with mild cognitive impairment (MCI), Alzheimer's Disease (AD), and normal controls (NC); to assess sensitivity and specificity.

Source: A validation study.

Sample: N = 277; 94 patients with MCI; 93 with AD; 90 healthy controls from the Jewish General Hospital (JGH), a tertiary referral clinic, and the University of Sherbrooke NRS memory clinic in Montreal.

Ethnicity: Race not addressed in the study. Those from JGH were 100% English-speaking while those from NRS were composed of primarily French-speaking participants (87%).

Measures: Mini-Mental State Exam (MMSE) and MoCA; demographic differences;

Findings: MoCA sensitivity in identifying MCI and AD was 90% and 100%, respectively. MMSE sensitivity in identifying MCI and AD was 18% and 78%, respectively. MMSE specificity in identifying NC's was 100%. MOCA specificity in identifying NC's was 87%. Positive predictive values for MoCA for MCI was 89%; negative predictive values for MoCA for MCI was 91%. Positive predictive values for MoCA for AD was 89%; negative predictive values for MoCA for AD was 100%.

Limitations: None identified. MoCa was found to be easy to be administered; one page and covering multiple domains.

National Institute of Arthritis and Musculoskeletal and Skin Diseases. (2012). *Osteoporosis and African American women.*, 2012, from http://www.niams.nih.gov/Health_Info/Bone/Osteoporosis/Background/default.asp

Aims: To educate and provide additional resources for practitioners on how osteoporosis affects African American women; and certain factors that place African American women at risk.

Source: A government website.

Sample: N/A.

Ethnicity: African American women.

Measures: N/A.

Findings: Osteoporosis widely underdiagnosed and undertreated in African American women. As African American women age, hip fracture risk doubles about every 7 years. African American women more likely to die post-hip fracture than White women. Diseases like lupus and sickle cell increase the risk of osteoporosis in African American women. Prevalence of lactose intolerance is as high as 75% in African American population; this intolerance can lead to avoidance of calcium-rich dairy products.

Limitations: Local sources of information lacking; computer savvy may benefit more than those who are not; readers must take into consideration the original source(s) of data; validation of findings; methods and funding of the original study.

National Institute of Diabetes and Digestive and Kidney Diseases. (2014). Lactose Intolerance. Retrieved from http://www.niddk.nih.gov/health-information/health-topics/digestive-diseases/lactose-intolerance/Pages/facts.aspx#cana

Aims: To provide information to the public on what is lactose and lactose intolerance, identify those most likely to experience lactose intolerance, learn how intolerance affects food choices, learn sources of lactose, and identify sources of calcium and Vitamin D that are both dairy and non-dairy.

Source: A health information publication from the National Institute of Health (NIH) directed to the public.

Sample: N/A; this was not a study.

Ethnicity: N/A.

Measures: N/A.

Findings: Lactose intolerance affects people by causing them to avoid certain foods that are rich in calcium and Vitamin D from milk and milk products because of the uncomfortable digestive symptoms that accompany lactose intolerance. Lactose intolerance occurs because of a deficiency of the enzyme called lactase, which is needed to digest and absorb lactose or milk sugar. Lactose intolerance is diagnosed via physical examination, health and dietary history, and family history. Two tests are the hydrogen breath test and the stool acidity test. According to research, even people with lactose intolerance can consume a minimum of 12 grams of lactose or 1 cup of milk without symptoms or with minor symptoms. To get adequate calcium and Vitamin D, people may gradually introduce small amounts of milk or milk products or they may use lactase products such as tablets or drops, or they may use lactose-reduced or lactose-free products. Lactose is found in many products, not just milk or milk-based products. Lactose is found in bread/baked goods, processed foods, salad dressings, nondairy products, margarine. Lactose can be in foods containing words like whey, curds, milk by-products, dry milk solids, and nonfat dry milk powder.

Limitations: This was not a research study. It was an abbreviated form of communications based on reports of research studies.

National Institute of Health Osteoporosis and Related Bone Diseases National Resource Center. (2012). *Osteoporosis overview.* Retrieved 6/1, 2012, from http://www.niams.nih.gov/Health_Info/Bone/Osteoporosis/overview.asp

Aims: This is a fact sheet providing information for the general population and the practitioner.

Source: Review of the current literature.

Sample: Not a study.

Ethnicity: Identified the ethnicities at risk including Caucasians, Asians, African Americans, and Hispanics.

Measures: Factors identified in studies affecting osteoporosis include calcium levels and intake; Vitamin D levels and intake; exercise levels; alcohol/cigarette consumption; medications affecting balance or interfering with calcium and Vitamin D absorption, thus causing fractures and decreased bone mineral density, falls.

Findings: Certain factors cannot be changed (body frame size; decreased sex hormone level associated with aging; gender and family history) .Factors that can be changed: prevent falls by changing the environment both inside and outside of the home; have bone mineral density measurements before the occurrence of fractures particularly if there are 2 or more fractures; treatment is multifactorial and focuses on a balanced diet, exercise to strengthen bones, and medication review.

Limitations: Information limited for those not in possession of a computer or knowledge of its use to make contacts for bone mineral density at the local community level.

National Osteoporosis Foundation. (2011). *Osteoporosis overview: Medicines that may cause osteoporosis; diseases that may cause osteoporosis.* Retrieved 6/1, 2011, from http://www.nof.org

Aims: To provide information for the public and practitioners on osteoporosis, the role medications play, and some of the diseases that affect osteoporosis.

Source: A government fact sheet.

Sample: Not a study; no age group particularly identified but addressed older adults.

Ethnicity: No specific ethnicity identified; generally addressing all ethnicities.

Measures: None.

Findings: Estimated the number affected to be 10 million Americans, with 3-4 million at risk as of the year 2005. By 2025, the cost for fracture-related osteoporosis is predicted to be approximately $25.3 billion/year. For men, 1 in 4 over age 50 will break a bone secondary to osteoporosis, with 12 million men at risk of breaking a bone; more men are at risk of breaking a bone related to osteoporosis than getting prostate cancer. Assessment includes bone mineral density (BMD); fracture/family history; labs, FRAX score; x-ray; lifestyle assessment; medication review and internal/external environment assessment; hormone level assessments.

Limitations: Information for people at the local level not posted; those elderly who are not internet savvy may not know how to access the information needed; it may prompt them to ask health are providers for information; readers must take into consideration the original source(s) of data; validation of findings; methods and funding of the original study.

National Osteoporosis Foundation. (2012a). *Osteoporosis clinical updates: Strategies for clinical practice Vitamin D and bone health.*

Aims: To educate the healthcare professional about Vitamin D deficiency and give examples of what assessment may consist of.

Source: A government website publication featuring evidence-based research on the role of Vitamin D, effect on bones, usage in the body, daily recommendations, and upper limits of intake.

Sample: This was not a research study; the website gave 2 case studies of elderly patients for understanding of assessment of Vitamin D status.

Ethnicity: N/A.

Measures: N/A.

Findings: Vitamin D has 2 forms, which are Vitamin D2 and D3. Both go through hydroxylation, in the liver to 25-hydroxyVitamin D (25[OH] D) or calcifidiol, then in the kidney to 1, 25-dihydroxyVitamin D (1, 25 [OF] 2D) or calcitriol. Calcitriol is used for bone formation and remodeling. Deficiency is defined as a blood level of 25-hydroxyVitamin D less than 10 ng/ml. Insufficiency is a blood level 10-30 ng/ml. Sufficiency is a blood level of 30 and above. Certain people are at particular risk of Vitamin D deficiency, namely infants receiving only breast milk, those with kidney disease, elderly, homebound people, people with malabsorption syndromes like Chron's, celiac disease and colitis, obese people, people with dietary restrictions, and those with gastric bypass; other factors are decreased dietary intake and people with dark skin. Daily recommended intake of Vitamin D ranges from 600 IU/day to 800 IU/day. Elderly above age 70 are recommended to take in a higher dose of 800 IU/day.

Limitations: N/A.

National Osteoporosis Foundation. (2012b). Osteoporosis clinical updates: Strategies for clinical practice. Vitamin D and bone health. Retrieved from http://nof.org/files/nof/public/content/clinicalupdates/clinicalupdates/Issue25VitaminD/2012_VitaminD.html

Aims: To explain the role of Vitamin D in maintaining healthy bone structure and make known the daily recommended Vitamin D intake for each age group and ways to help attain optimal intake without exceeding and identify those at risk for deficiency.

Source: A national website providing information for the public and professionals.

Sample: N/A; all age groups were represented.

Ethnicity: N/A.

Measures: N/A; this was not a study.

Findings: Vitamin D insufficiency has been defined by the Institute of Medicine and the National Center for Health Statistics as having a blood level of 25-hydroxy Vitamin D (25 [OH[] of less than 20 ng/mL (<50 nmol/L). The Endocrine Society and the National Osteoporosis Foundation defined insufficiency as 25(OH) D <30 ng/mL (<75 nmol/L). National Osteoporosis Foundation (NOF) defined Vitamin D deficiency as a 25-hydroxyVitamin D blood level <10ng/ml. Insufficiency is a 25-hydroxyVitamin D level 10-30 ng/ml; Vitamin D sufficiency is a level of 30 and above. There are 2 forms of Vitamin D: D2 or ergocalciferol found in supplements and fortified foods. D3 is found in foods like fatty fish, egg yolks, and liver. Both are inactive and are activated in the liver, then the kidney to calcifidiol and calcitriol, respectively. When serum parathyroid levels (PTH) are high and phosphorous levels are low, 25 (OH) D is activated to 1, 25 (OH) 2D. Sufficient levels of 25 (OH) D, absorption of dietary calcium is 30-40%. Decreased levels of 25 (OH) D results in decreased absorption of dietary calcium to about 10-15%. Maximum dietary absorption of calcium occurs at 25 (OH) D levels of 32 ng/mL and above. People at risk of deficiency included: babies given only breast milk; homebound persons (limited sun exposure); people with fat malabsorption like Crohn's disease, colitis, cystic fibrosis, inflammatory bowel disease; obese; elderly over age 60; people who had gastric bypass; people on dietary restrictions (vegan, milk allergies, lactose intolerant, ova-vegetarians). Recommended daily allowances: children 1-13 years: 15 micrograms or 600 IU/day; teenagers 14-18 years: 15 micrograms or 600 IU/day; adults: 19-70 years: 15 micrograms (600 IU/day); adults over 70 years: 20 micrograms or 800 IU/day; pregnant and lactating women: 15 micrograms or 600 IU/day.

Limitations: This was not a study.

National Osteoporosis Foundation. (2012c). What women need to know. Retrieved from http://nof.org/articles/235

Aims: To define osteoporosis and give the explanatory analysis of the condition among the ethnic groups and different age groups of women.

Source: A national website.

Sample: N/A.

Measures: N/A.

Findings: It is estimated that 10 million Americans have osteoporosis; 8 million are women. Women are at increased risk as their estrogen levels decrease with advancing age or menopause. Those ethnic groups at greatest risk are Asians (20%), Whites (20%), Latinas (10%), and African Americans (5%). Among Whites, more than half age 50 and over are estimated to have low bone mass or osteopenia. Between ages 20-80, a third of the bone mineral density lost by White women is lost at the hip. For Asian American women, more than half age 50 and over are estimated to have low bone density or bone weakness that has not yet progressed to osteoporosis. Approximately 90% of Asian American adults have lactose intolerance; 35% of African American women are estimated to have osteopenia or low bone mass. Seventy percent of African American women are estimated to have lactose intolerance; African American women are more likely to have diseases that can result in osteoporosis. Among Latinas, half of those over the age of 50 have low bone mass. Lactose intolerance is present among Latinas; no number or estimate was given for the number of Latinas who may have lactose intolerance. Menopause plays a role in determining chances of getting osteoporosis. Two menopausal factors are the amount of bone a woman has going into menopause and the rate of bone loss after reaching menopause. Protection of bone health starts in the teen years. Getting adequate calcium, weight-bearing exercises, and avoidance of smoking and alcohol are important. Bone mineral density is the test that determines the amount of bone present at the hips, spine or wrist. Osteoporosis in premenopausal women usually is the result of a medical condition. Medications used for postmenopausal treatment of osteoporosis are not approved for treatment in premenopausal women. Treatment is geared toward prevention through diet and exercise.

Limitations: This was not a study, but an educational publication based on studies done by others and summarized for the general public.

National Stroke Association. (2011). *African Americans and stroke.* Retrieved 6/1, 2011, from http://www.stroke.org/site/Pageserver?pagename=AAMER

Aims: To educate the public and provide a starting point of information to professionals about the impact of stroke on the African American community.

Source: Not a study, but a fact sheet from a national resource center based on information from scientific literature stated simply.

Sample: N/A.

Ethnicity: Focus on African American men and women; no age group specified.

Measures: Not a study; factors predisposing African Americans to greater numbers of stroke presented.

Findings: African Americans as an ethnic group have been impacted the most by stroke, with stroke occurring earlier in life than in Caucasians and causing disability. Higher stroke rate attributed to greater numbers of African Americans being diabetic, having high blood pressure, having sickle cell anemia, being obese, and smoking. Mortality is higher than in Caucasians; strokes are more severe, with survival rate 1 year after having an ischemic stroke in women lower. African Americans aged 20-44 were 2-4 times more likely to suffer a stroke compared to Caucasians and were less likely to receive tPA for treatment of stroke.

Limitations: Studies producing this information or references not provided; readers must take into consideration the original source(s) of data; validation of findings; methods and funding of the original study.

Nevitt, M. C., Cummings, S. R., & Hudes, E. S. (1991). Risk factors for injurious falls: A prospective study. *Journal of Gerontology, 46*, M164-70.

Aims: To examine the consequences of falls in a sample of community-dwelling elderly with a history of falling in the past year.

Source: A prospective, 1-year study with weekly follow-up.

Sample: N = 325 community-dwelling elderly, age >65, with a history of fall in the past year; females N = 266.

Ethnicity: Whites=266 or 82%; other races not identified.

Measures: Race, injury, gender, BMI, grip strength, reaction time, walking speed, chair rise time, proximal leg strength, time of Trail Making B test, Mini-Mental State Exam (MMSE) score, Geriatric Depression Scale score, corrective visual acuity. Circumstances of falls: did individual take a sedative in the past 24 hours or alcohol within 6 hours of the fall; acute illness with activity restriction in the past 7 days; any loss of consciousness; hazards in the environment; the place where the fall occurred; physical activity just prior to the fall; and type of surface area the fall occurred on.

Findings: More than half fell 2 or more times, 2/3 were fearful of falling. Fifty-eight percent or 189 reported 589 falls; 49 (9%) had loss of consciousness; 40 (21%) had 2 or more falls; 68 (36%) 3 or more falls; 5 (3%) syncopal falls; 18 (9%) had both syncopal and non-syncopal falls. Forty-two percent of those who fell limited activities with reasons given being injury, fear, and doctor's orders. Most nonsyncopal falls occurred in or around the home (52%), with those older than 80 more likely to fall at home (61%). Fourteen percent of those who fell reported lying there unable to get up for at least 5 minutes. Adjusting for age and sex, the risk of major injury was greater among those who fell and experienced a fracture in the previous year, among Whites, those taking longer to complete the Trail Making B Test, those with poorer MMSE scores, and those with slower reaction times and poorer visual acuity.

Limitations: Subjects primarily female and White; findings may not be generalized to other more varied populations; study limited to those with a history of falls in the past year (not all older persons fell in the past year and these people were not included as a comparative group); self-report only, no verification of fracture history with a previous chart, other reports.

New York State Office of Alcoholism and Substance Abuse Services. (2010). *Addiction Medicine—Elderly Alcohol and Substance Abuse.* Retrieved September 21, 2010, from http://www.oasas.state.ny.us/AdMed/FYI/FYIInDepth-Elderly.cfm

Aims: To inform the public and professionals of dangers of alcohol abuse among elderly.

Source: A state government fact sheet providing information based on the work of Hays et al. (2002) on alcoholism and substance abuse.

Sample: Not a study but facts based on the study; elderly aged 65 and older.

Ethnicity: Not specified; not applicable.

Measures: No measures; not applicable.

Findings: As many as 17% of elderly or 2.5 million older adults and 21% of elderly hospital patients suffer from alcohol-related problems. Two types of alcohol abusers identified: the long-time users and the recent users. Recent users have some type of stressors that trigger use: loss of family, spouse, friends, beloved pets, health, and income. Alcohol among elderly is particularly problematic due to combination with prescription and nonprescription medications, some with sedating properties; age-related decrease in metabolism due to decreased renal and hepatic blood flow; increased fall and fracture risks. Providers, both professional and nonprofessionals, need to be aware and vigilant for suspected alcohol use/abuse, memory problems, depression, bruisingm and other injuries from falls and repeated falls, mood alterations, malnutrition, and changes in life situations. Women are more vulnerable to depression and more apt to be prescribed medications such as benzodiazepines.

Health care professionals need to be aware and educate family and providers. Valuable screening instruments include: AUDIT-C, CAGE, the Short Michigan Alcoholism Screening Test-Geriatric Version (S-MAST-G). Medication inventory, both for prescription and nonprescription medications for drug interactions, assessment of social activity participation, involvement in support groups, treatment with Naltrexone are other options discussed.

Limitations: There are no links to further resources within communities; readers must take into consideration the original source(s) of data; validation of findings; methods and funding of the original study.

Office of Minority Health and Health Disparities (OMHD). (2008). *Eliminate disparities in lupus.* Retrieved June/15, 2012, from http://www.cdc.gov/omhd/AMH/factsheets/lupus.html

Aims: To educate the practitioner and the public on the effect of lupus on the Black community.

Source: A government-funded website.

Sample: Not a study but the population being discussed suffers from lupus of any kind.

Ethnicity: African American/Black.

Measures: Epidemiological patterns of the disease in African Americans/Blacks.

Findings: Lupus is 3 times more prevalent among African Americans/Blacks, with a death rate from systemic lupus erythmatosis (SLE) between the years 1979-1998 that increased 70% for African American females age 45-64. Death rates were 3 times higher among Blacks compared to Whites with SLE, with Blacks suffering more severe organ involvement, in particular kidney problems.

Limitations: Sources of funding for original funding may not be known; validation of findings on government websites as secondary data.

O'Halloran, A. M., Penard, N., Galli, A., Fan, C. W., Robertson, I. H., & Kenny, R. A. (2011). Falls and falls efficacy: The role of sustained attention in older adults. *BMC Geriatrics, 11*, 85.

Aims: To examine the association between falls and falls efficacy and attentional performances and variability in elderly fallers and non-fallers without impaired cognition.

Source: A cross-sectional, correlational study.

Sample: N = 458 community-dwelling men and women age >60 from a convenience sample who underwent a comprehensive geriatric assessment at a TRIL clinic. Of the sample, 321 were female (164 were non-fallers, 157 were fallers); most were self-referrals (66.8%), with the remainder (33.2%) referred by professionals.

Ethnicity: Presumably all White since they were from Dublin, Ireland, and there was no mention of other races.

Measures: Self-report of falls in the previous year; falls efficacy using the Modified Falls Efficacy Scale (MFES); number of comorbid illnesses using the Charlson Comorbidity Index (CCI); psychosocial measures using the Hospital Anxiety and Depression Scale (HADS); depression using the 8-item simplified version of the Centers for Epidemiological Studies Depression Scale (CES-D); body mass index (BMI); functional performance with activities of daily living and instrumental activities of daily living scales (ADL, IADL); gait and balance with Timed Up and Go Test (TUG); balance with Berg Balance Scale (BBS); cognition with the Mini-Mental State Exam (MMSE) and the Cognitive Failures Questionnaire (CFQ); Sustained Attention to Response Task (SART) which recorded reaction time, standard deviation or variability of reaction time, commission and omission errors; reaction data with the Fast Fourier Transform Procedure (FFT). Control variables were age and gender.

Findings: There were significantly more female fallers vs. male (58.4% vs. 31.6%, $X^{2(1)} = 21.73$, $p < 0.001$), fallers were older (t (458) = 7.26, $p < 0.001$). Fallers had lower mean MFES vs. non-fallers (8.85 vs. 9.56, $p = 0.001$). Increases in SDRT and SART RT was associated with falls and low falls efficacy ($p < .01$ and $P < .05$). Increased SDRT was associated with decreased vigilance or top-down functioning, was a predictor of falls ($p < 0.01$, OR = 1.14, 95% CI: 1.03-1.26) and was associated with lower MFES scores among those who were classified as non-fallers ($p = 0.07$).

Limitations: Cross-sectional design offered only a snapshot of data at one point in time; participants were cognitively intact and most were self-referred; participants were able to ambulate independently with or without a walking aid; convenience sampling used; retrospective data obtained on falls.

Parsons, J. K., Mougey, J., Lambert, L., Wilt, T. J., Fink, H. A., Garzotto, M., Barrett-Connor, E., & Marshall, L. M. (2009). Lower urinary tract symptoms increase the risk of falls in older men. *BJU International, 104,* 63-68.

Aims: To address gaps in the research, this has been mostly focused on women; to evaluate the association of falls to lower urinary tract symptoms.

Source: A prospective cohort study with repeated measures with baseline physical assessment and at 1-year follow-up with a questionnaire.

Sample: N = 5,872 men enrolled in the Osteoporotic Fractures in Men study (MrOS); community-dwelling men age >65.

Ethnicity: Ninety percent White, 4% African American, 2% Hispanic, 3% Asian, 1% other.

Measures: Demographics (age, race/ethnicity, educational level, marital status, self-reported health status); lifestyle (smoking, alcohol use); medical conditions (AUA symptom index or AUA-SI); physical activity using the Physical Activity Scale for the Elderly (PASE); prescription medications; BMI, physical performance and function (grip strength, gait speed, narrow walk, assistive devices for walking, mobility restrictions); falls in the past 4 months.

Findings: Sufferers of severe LUTS were older, had lower physical activity scores, arthritis or gout, BPH, recent dizziness, fall in past year, heart attack, hypertension, stroke, urological medication usage ($p < .001$). At follow-up, 1,489 or 25% had at minimum one fall, 694 or 12% repeated falls. Unadjusted 1-year cumulative fall incidence of any fall varied by symptom severity with 22% for mild, 27% for moderate, and 37.4% for severe LUTS. Adjusted 1-year cumulative incidences of any fall and repeated falls were significantly higher with moderate to severe LUTS.

Limitations: Healthy, volunteer sample of mostly non-ethnic males**.**

Peel, N. M., McClure, R. J., & Hendriks, M. R. (2007). Psychosocial factors associated with fall related hip fractures. *Age and Ageing, 36*, 145-151.

Aims: To examine the psychosocial risk factors associated with hip fractures among the elderly.

Source: A case control design; correlational study with cross-sectional data collection.

Sample: N = 387 males and females; age >65. Cases = 126, males = 23, females = 103. Cases were patients admitted for treatment of fall-related hip fractures. Controls = 261, males = 47, females = 214. Controls were community-based, from electoral rolls matched for age, sex, and postal codes.

Ethnicity: Australians = 289; English-speaking country = 68; non-English-speaking country = 30.

Measures: Age, sex, education, financial status, country of birth, fall history, comorbidities, sensory/motor limitations; community support (marital status, household composition, residential environment, length of residence, community-integration); psychosocial well-being (self-rated health, emotional health, stress exposure); engagement with life (IADLs, driving, productive and social activities).

Findings: Significant predictors of hip fracture were osteoporosis, respiratory disease, and hearing problems. Significant psychosocial factors that were protective for hip fractures were being married (OR .44 [.22-.88]); living in their residence for more than 5 years (OR .43 [.22-.84]); having private health insurance (OR .49 [.27-.90]); use of proactive coping strategies (OR .52 [.29-.92]); having higher life satisfaction (OR .47 [.27-.81]); social engagement (OR .30 [.17-.54]).

Limitations: The limitations of a case control design; no information on instruments used to collect data in terms of description, validity/reliability; information subject to recall bias; proactive coping strategies not clearly defined but was the only factor in which authors/researchers used an instrument (Ways of Coping Checklist); however, no data or description of the instrument were provided.

Peel, N. M., McClure, R. J., & Hendrikz, J. K. (2006). Health protective behaviors and risk of fall-related hip fractures: A population-based case-control study. *Age and Ageing*, *35*, 491-497.

Aims: To examine what health protective behaviors are associated with fall-related hip fractures in community-dwelling elderly.

Source: A case control study; correlational study with cross-sectional data collection.

Sample: N = 387 males and females. Cases = 126, males = 23, females = 103. Cases were elderly being treated for acute fracture of the femur between May 2003 and October 2004. Controls = 261, males = 47, females = 214.

Ethnicity: Australians = 289; English-speaking country = 68; non-English-speaking country = 30.

Measures: Demographics (age, sex, education, country of birth); smoking (current, past with years smoked, never); alcohol (none, low, moderate over 3 life stages--older age more than 65, middle age 40-64, and young adulthood 15-39); body weight (BMI); diet (over the 3 life stages); physical activity (sports enjoyed, minutes/week walked); preventive care; home safety; reproductive health; self-health (having power of attorney, 7-8 hours sleep, use of sunscreen).

Findings: Protective behaviors significant in prevention of hip fracture included never smoking, moderate alcohol use in mid-old age, not losing weight in mid-old age, sports participation, preventive medical care, self-health behaviors. Significant independent predictors of hip fractures included having respiratory diseases, hearing deficits, limitations in activities of daily living (ADLs), and prior hip fractures.

Limitations: Limitations of case control designs, no data on instruments used in data collection in terms of validity/reliability; recall bias.

Peterka, R. J. (2002). Sensorimotor integration in human postural control. *Journal of Neurophysiology*, *88*, 1097-1118.

Aims: To study postural control using continuous perturbation systematically to monitor responses in various situations.

Source: A two-group, experimental design with one group getting time for testing limited and using only backboard trials (those with vestibular loss) and the other group getting 5 stimulus amplitudes out of 6 conditions administered in random order (normal subjects).

Sample: N = 12; 8 subjects were normal and had no balance impairment, with ages ranging 24-46 years; 4 subjects had bilateral vestibular loss (VL) and their ages ranged 48-58 years.

Ethnicity: Not addressed in this study.

Measures: Outputs of interest were body and backboard anterior and posterior centers of mass (COM); sway motion; angular velocity.

Findings: Maintenance of upright stance requires complex interplay of systems. Those with VL increasingly relied on vestibular cues as changes applied. Increased amplitude of stimuli resulted in increased stiffness even among those normal subjects, and increasingly so for those with VL.

Limitations: Very small sample size; did not address any differences in ethnic groups; age group did not apply to my study; complex discussion may result in loss of interest in my target audience, which is nursing.

Powell, L. E., & Myers, A. M. (1995). The Activities-Specific Balance Confidence (ABC) Scale. *The Journals of Gerontology: Series A, Biological Sciences and Medical Sciences, 50A*(1), M28-34.

Overview: Up to 50% of elderly age >65 fall yearly, and that number may be an underestimate because usually falls with injury and loss of function are reported typically. Psychological effects may lead to decreased activity and independence. Self-imposed fear or loss of confidence occurs in 50-60% of fallers, up to 33% limit activities; this fear is not observed only in fallers but can be found in those who have not fallen. Fear of falling (FOF) is a confounder in performance measures; activity restriction is mediated by FOF.

Sample and Ethnicity: N = 60; community-dwelling elderly, either high- or low-mobility confidence based on their need for help with walking aid or help with walking outside.

Aim: To compare FES (Falls Efficacy Scale) to the ABC scale (Activities-Specific Balance Confidence Scale).

Methods: Development of the tool using 15 clinicians and 12 outpatients; 45-minute interview to 60 elders in their homes or at the seniors' club for psychometric testing; readministration of ABC approximately 2 weeks later to a subgroup of 21 elders agreeable to balance testing.

Variables and Instruments: FES (10 items), ABC (16 items), PSES (Physical Self-Efficacy Scale), and PANAS (Positive and Negative Affinity Scale). The last 2 scales assessed convergent and discriminate validity.

Findings: ABC was more appropriate for more active seniors, with greater specificity and included more activities that some elders may perceive as hazardous and respond by saying they just do not do that activity. ABC better discriminator of high- vs. low-mobility patients, $r = .84$, $p < .001$. Cronbach's alpha of .96 high internal consistency of ABC.

Quandt, S. A., Stafford, J. M., Bell, R. A., Smith, S. L., Snively, B. M., & Arcury, T. A. (2006). Predictors of falls in a multiethnic population of older rural adults with diabetes. *The Journals of Gerontology: Series A, Biological Sciences and Medical Sciences*, *61*, 394-398.

Aims: To examine fall rates in rural elderly with diabetes and identify health-related factors associated with falling.

Source: A cross-sectional study with participants from the ELDER study (Evaluating Long-Term Diabetes self-management among Elder Rural adults) using a stratified, random sample.

Sample: Community-dwelling elderly males and females (N = 691), ages >65 with diabetes, residents of one of two rural North Carolina counties, two or more outpatient Medicare claims for diabetes from 1998-2000.

Ethnicity: Black/African American, White or Native American. The final totals were: African Americans 217, Native Americans 179, Caucasian Americans 295; males: 341, females: 350.

Measurements: A self-report of falls in the past year. Income status was classified as one of three categories: Medicaid recipients, no Medicaid with income of <$25,000, and no Medicaid with income >$25,000. Other clinical measures were duration, therapy type, and glycemic control as assessed by HbA1c either via finger stick or liquid chromatography. Self-report of whether or not they saw a doctor or whether a doctor did an evaluation of the nerves in their feet. Yes or no answers to questions relating to slow foot healing, tingling/numbness of the feet, eye problems not correctable with glasses, presence of neuropathy, arthritis or stroke. Self-report of number of chronic illnesses, number of medications, body weight and height were taken. Calculated BMI. Quantitative data on quality of mental and physical life were obtained from the Medical Outcomes Trust Short Form Health Survey; physical function and mobility with the Medical Outcomes Study (MOS) Physical Function Measure.

Findings: In this study, rates of falls were higher than other studies reported in the general population. The more medications the patient was taking, the greater the number of associated falls, even though diabetes medications were not associated with frequent falls. Predictors of falls in this study were similar to other prior studies. In the past year, 302 (43.7%) fell a minimum of once, 181(26.2%) fell >2 times in the past year. Falls in the past year were related to: income and household size, slowness of foot healing, presence of numbness/tingling, visual problems, number of chronic illnesses, poorer physical functioning with low scores on mental and physical quality of life assessment, and increased number of medications. Frequent fallers were more likely with men, on diabetic medications, experiencing neuropathies; having a history of stroke, lower physical functioning, and mobility; on more medications with a longer duration of diabetes, and more likely to have received care from a podiatrist in the past year.

Limitations: Cross-sectional study; no comparison groups, no experimentation. They lacked data on specific medications used and the presence of peripheral vascular disease; researchers admitted they did not collect data on the circumstances, severity, or outcomes of the falls; no description of the tools nor any validity or reliability were given for the tools used.

Raji, M. A., Tang, R. A., Heyn, P. C., Kuo, Y. F., Owen, S. V., Singh, S., & Ottenbacher, K. J. (2005). Screening for cognitive impairment in older adults attending an eye clinic. *Journal of the National Medical Association, 97*, 808-814.

Aims: To identify factors associated with mild or severe cognitive impairment.

Source: A cross-sectional, correlational study.

Sample: N = 100; males N = 42 and females N = 58; age >55 attending the University of Texas Medical Branch (UTMB) Eye Center for outpatient eye examination.

Ethnicity: Whites N = 61, non-Whites N = 39. Non-Whites included African Americans and Hispanics.

Measures: Cognitive impairment measured with the St. Louis University Mental Status Exam (SLUMS); visual impairment (Snellen chart, Rosenbaum screener, refractor, Ishihara plates, Amsler grid, Haig Streit 900 or equivalent slit lamp, Goldman tonometer, ophthalmoscope examination on a dilated fundus); gender; ethnicity; years of education; marital status; systolic blood pressure; self-report of presence of a physician diagnosis of stroke, diabetes, hypertension; physical activity with the Physical Activity Scale for the Elderly (PASE).

Findings: In terms of the SLUMS assessment, 35 participants scored normally, 65 had scores indicating cognitive impairment. Forty-six had mild cognitive impairment, 19 severe impairment. Non-Whites significantly more cognitively impaired than Whites (76.9% non-Whites vs. 57.4% [202] Whites, $p = .046$). Diabetics were more likely to be cognitively impaired than non-diabetics (81.6% vs. 54.8%, $p = .007$). No significance between visual acuity and cognition ($p = .059$). Unadjusted, the odds ratio (OR) of cognitive impairment for non-Whites was 2.48 (95% CI = 1.01-6.10); controlling for age, education, and systolic blood pressure, odds of impaired cognitive function greater if participants were non-White. Diabetes predictive of cognitive impairment after controlling for all variables (OR 3.28, 95% CI = 1.21-8.90).

Limitations: Cross-sectional design, so unable to make causal inference; small sample size (may have been a factor in inability to finding association between visual acuity and cognition and may not have allowed investigators to investigate differences between the ethnic groups); instrument accounted for mild and severe impairment but not moderate impairment; university-based clientele may not be similar to other populations, limiting ability to generalize findings.

Resnick, B., Nigg, C. (2003). Testing a theoretical model of exercise behavior for older adults. *Nursing Research, 52*, 80-88.

Aims: Using self-efficacy and outcome expectations from Bandura's Social Cognitive Theory and the Transtheoretical Model (TTM) to test components of these theories to explain exercise behavior.

Source: A single-interview descriptive study.

Sample: N = 179 elderly from a continuing care retirement community with a Mini-Mental State Examination (MMSE) score >24.

Ethnicity: Whites.

Measures: Self-efficacy expectations using the Self-Efficacy for Exercise (SEE) scale; outcome expectations using the Outcome Expectation for Exercise (OEE) scale; a question assessing exercise level (do you participate in a minimum of 20 minutes of continuous exercise 3 times weekly?); health status using the SF-12; fear of falling (a rating scale from 0-4, with 0 = no fear and 4 = a lot of fear); stage of change related to exercise (Stages of Change questionnaire by Marcus and Shelby).

Findings: Eleven out of 22 paths were statistically significant. Poor fit of hypothesized model, which included a direct path between outcome expectation and exercise behavior. Health status and social support influenced self-efficacy and outcome expectations, which directly affected exercise behavior and stage of change. Social support directly affected stage of change. Health and social support combined explained 59% of outcome expectations and 63% of self-efficacy expectations. Health, self-efficacy, outcome expectations, and fear of falling explained 48% of stage of change. Together, the variables in the model explained 64% of exercise behavior in elderly adults. There was a poor fit of hypothesized model with the revised model. Age, sex, social support, and fear of falling were related to health status and fit better in explaining slightly more of the variance in exercise (66% vs. 64%).

Limitations: Small sample size for structural equation modeling; one-time interview instead of a longitudinal series of interviews; all participants were White, female, and at least high school-educated.

Resnick, B., Orwig, D., D'Adamo, C., Yu-Yahiro, J., Hawkes, W. G., Shardell, M., Golden, J., Zimmerman, S., & Magaziner, J. (2007). Factors that influence exercise activity among women post hip fracture participating in the Exercise Plus Program. *Clinical Interventions in Aging, 2*(3), 413-427.

Participant characteristics: N = 207 all-female with 54 lost by the 12-month follow-up. Ninety-six percent were White; age 80.7 years; community-dwelling, post-hip fracture surgery recruited from 6 hospitals in Baltimore area, MMSE >20. Study design: secondary data analysis of a RCT using repeated measures at baseline, 2, 6, and 12 months post-hip fracture. Subjects randomized to 1 of 4 groups. Theory-based study (Social Cognitive Theory by Bandura and Trans-Theoretic Model by Prochaska and Velicer).

Variables/Tools: Dependent variables included demographics; SF-36, CES-D, FOF (1 question), NRS (pain), SSE (social support), SEE (self-efficacy), OEE (outcome expectation), stage of change questionnaire. A short description and reliability/ validity information on tools provided in a table. Independent variables included Exercise Plus Program, exercise only, plus only, routine care.

Findings/Limitations: At 2 months, those with better cognitive status, less comorbidity had: higher self-efficacy expectations, greater social support for exercise, stronger outcome expectations, stronger self-efficacy, higher stage of change, more time exercising. At 6 months, exposure to any group resulted in better health, stronger self-efficacy expectations, less dependence on expert for exercise, were younger, and had better mental health, more social support, and less fear of falling. By 12 months, better health and less fear of falling were related to better self-efficacy expectations, outcome expectations, and higher stage of change. Limitations: small, homogeneous sample. Falls not an outcome and fear of falling was one of many dependent variables.

Resnick, B., Luisi, D., & Vogel, A. (2008). Testing the Senior Exercise Self-efficacy Project (SESEP) for use with urban dwelling minority older adults. *Public Health Nursing (Boston, Mass.), 25*(3), 221-234.

Aims: A feasibility study of the effectiveness of the Senior Exercise Self-efficacy Project (SESEP) in a population of urban, ethnic, and elderly.

Source: A feasibility study using a randomized, controlled design, with data collection at baseline and follow-up 2-4 weeks postintervention.

Sample: N = 166, age 73 (SD 8.2 years), majority female (81%), unmarried (86%), retired (77%), high school-educated (64%)

Ethnicity: African Americans N = 121, Latino N = 33, Other N = 12.

Interventions: The SESEP group (N = 100) had 12 weeks of stretching, resistance and aerobics, written materials, culturally relevant activities, and efficacy-increasing intervention. The efficacy-enriching component of the intervention was delivered once a week during the first class of the week for 30 minutes and consisted of benefits of exercise and activity and methods to overcome barriers and well as means to achieve goals. Nutrition education was 1-1.5 hours of group forums.

Controls: N = 66 who received nutrition education 2x/wk.

Measures: Demographics (age, gender, race/ethnicity, marital status, education, employment; chronic disease status: subjective report; self-efficacy: self-efficacy for exercise scale (SEE); time exercising and physical activity using the Yale Physical Activity Survey (YPAS); health-related quality of life (HRQOL scale, 12-items); depressive symptoms using Geriatric Depression Scale (GDS); pain using a numeric scale; FOF using a rating scale from 0-4; outcome expectations for exercise (OEE scale); chair rise time without using the arms and mobility using the Tinetti scale.

Findings: The intervention group had significantly higher outcome expectations related to exercise and time spent exercising. No significant difference in self-efficacy expectations. Significantly fewer depressive symptoms were seen in the treatment group after the intervention. No difference between groups in relationship to pain, FOF, mobility, and health-related quality of life.

Limitations: The majority of the sample was high school-educated; outcomes were based on self-report and not objective measures of physical activity, unknown actual time spent in exercise during class, significant loss of participants to follow-up, possibly due to the single one-day testing for follow-up, no information why participants did not show.

Limitations: Data were from self-reports and no objective measures; most participants had a minimum of a high school education; time spent in actual exercise and intensity of exercise were not known; 1 day of testing to obtain both baseline and follow-up data; significant loss of participants to follow up with no reason why.

Rose, D. K., Paris, T., Crews, E., Wu, S. S., Sun, A., Behrman, A. L., & Duncan, P. (2011). Feasibility and effectiveness of circuit training in acute stroke rehabilitation. *Nueurorehabilitation and Neural Repair, 25,* 140-148.

Aims: A feasibility study comparing 2 programs of stroke rehabilitation: standard care vs. circuit training.

Source: A non-blinded, non-randomized controlled trial. Standard Physical Therapy (SPT) gait, transfer, range of motion, balance training 1:1 for an hour and a half daily 5 times per week. Circuit Training Physical Therapy (CTPT) was the same duration of time, 1:1 but with 4 task-specific, individualized, repetitious station exercises 13-14 minutes/each with family education, orthotic/wheelchair prescription, and home education.

Sample: N = 182 males and females diagnosed with a stroke, age >18; community-dwelling, cleared for rehabilitation, able to follow 1-step instruction, stay >5 days in stroke service of Brooks Rehabilitation Hospital, Jacksonville, FL.

Ethnicity: Not addressed.

Measures: Sociodemographics; stroke risks; gait speed (5 MWT); functional balance (Berg Balance Test); motor/sensory control of lower extremities (Lower Extremity Fugl-Meyer and Sensory Assessment); Functional Independence Measure Mobility portion (FIM-M); phone version of Functional Independence Measure (FONE-FIM); Stroke Impact Scale (SIS-16), with the latter 2 measures done 90 days post-stroke.

Findings: CTPT group had increased gait speed from admission to discharge vs. the SPT group (.21+/-.25 vs. 0.13 +/-0.22; p = .03), with interaction effects between group and baseline severity. At 90-day follow-up, 156 (87%) showed no difference between groups (measured by FONE-FIM, SIS-16, and living location).

Limitations: Non-randomized; only telephone follow-up, no physical assessment; SPT group more depressed than CTPT group; no tracking of therapy at discharge.

Rubenstein, L. Z., Josephson, K. R., Trueblood, P. R., Loy, S., Harker, J. O., Pietruszka, F. M., & Robbins, A. S. (2000). Effects of a group exercise program on strength, mobility and falls among fall prone elderly men. *Journal of Gerontology: Medical Sciences, 55A*, M317-M321.

Aim: To examine the effect that a targeted exercise program has on strength, endurance, mobility, and fall rates.

Source: A randomized, controlled trial involving 3 exercise sessions per week for a total of 12 weeks, with each session lasting 90 minutes. Measures were taken at baseline, one week after completion of the intervention.

Sample: N = 59 community-dwelling men, age >70 with at least one of the following: lower extremity weakness, impaired gait, impaired balance, or >1 fall in the past 6 months. Participants were randomized to the intervention (n = 31) or to the control group (n = 28).

Ethnicity: In the intervention group, Whites made up 96.8%. In the control group, Whites made up 92.9%. No other racial groups were described.

Measures: Outcome was the number of falls and injuries via telephone every 2 weeks or by questioning them at the classes. The predictor variable was the Yale Physical Activity Survey (YPAS). Other variables included isokinetic strength of the hip, knee, and ankle with a CYBEX 330 System; sit to stand test; 6-minute walk test; an indoor obstacle course; Performance Oriented Mobility Index (POMI); physical functioning, role limitations, and general health perceptions measures with RAND 36-item Health Survey (SF-36).

Findings: Exercise group showed greater improvements compared to non-exercisers in endurance and gait. Exercisers had increased time spent per week in activity as indicated by their scores on the YPAS (p = .03) as a result of the time in exercise classes (4.5 hours/week) compared to controls, who showed no change in weekly activity.

Limitations: Small sample size; short follow-up period; findings may be unique to this group or due to the effect of exercise on unadjusted fall rates; other risk factors may have been reduced.

Ryan, J. W., Dinkel, J. L., & Petrucci, K. (1993). Near fall incidence. A study of older adults in the community. *Journal of Gerontological Nursing, 19*, 23-28.

Aims: To identify near-fall incidents and determine the method of near-fall collection.

Source: Correlational, non-interventional study.

Sample: N = 21, age range 70-91, with a mean of 79.5 years, 10 county residents and 11 from a retirement home. Eighty percent of the population was female (N = 16) and 20% male. One participant eliminated due to incomplete data.

Ethnicity: Not specified.

Measures: For 21 consecutive days, data were collected that included age, time at current residence, number of other people in the household, last fall or near fall, and use of assistive devices. Near-fall data were collected via phone at a prearranged time (N = 19). For those without phones at home, preaddressed, stamped postcards were used (N = 2). These postcards contained 2 questions for which participants could check either yes or no.

Findings: Based on 20 participants who provided complete data. Median time at location was 10 years. County residents were in their current location for 20 years or more and retirement home residents from 3-5 years. Retirement residents were almost 10 years older than county residents, with 5 out of 7 retirement home residents using assistive devices. Twenty-five percent (N = 5) could not remember the last time they fell, while 50% (N = 10) said their last fall was in the past year. Fifty percent (N = 10) could not remember the last near-fall experience; of those who could remember, 70% (N = 7) said they almost fell in the past month. One fall was recorded during the study period. Near-fall incidence was 19 of 4.7%, with 7 subjects (35%) responsible for 19 near falls (4 from the retirement home, 3 county residents). One county resident reported 8 near-fall incidents, with 1 retirement home resident reporting 5 near falls. One near-fall reporter used an assistive device. Near fallers' mean age was 778.7 years, a year younger than non-near fallers. Near fallers lived in their current location a median of 5-10 years, less than non-near fallers, who had a median of 10-20 years. Near fallers reported their last fall a median of within the past year and non-near fallers within a year. Near fallers remembered and reported their last near fall within the past month, whereas7% of non-near fallers did not remember when, if ever, they experienced a near fall.

Limitations: Small sample size; difficult using this approach for data collection with a large sample size, especially if they have no phone.

Saha, S., Taggert, S. H., Komaromy, M., & Bindman, A. B. (2000). Do patients choose physicians of their own race? *Health Affairs, 19*, 76-83.

Aims: To examine the possible reasons minorities prefer and seek care from their own race.

Source: A secondary data analysis of data from the Commonwealth Fund 1994 Comparative Survey of Minority Health Care, originally a telephone survey.

Sample: N = 2,045.

Ethnicity: African Americans = 645 (males 39%); Hispanics = 542 (males = 43%); Whites = 858 (males = 44%).

Measures: Sources of care; health and socioeconomic status.

Findings: Positive correlations between the ability to choose the race of the physician and seeing a physician of their own race. Race a factor in choice even controlling for location and other factors. African Americans with same race providers were: younger, less educated, residents of urban areas, and uninsured compared to those with non-Black providers. Hispanics seeing same race physicians were influenced by language and were more likely to live in urban areas. Whites under the care of same-race physicians were influenced by geographical location and availability (their own race was more accessible).

Limitations: Secondary data analysis (how concepts were defined and what questions were originally asked and how they related to what was being explored were not known).

Sarrai, M., Duproseau, H., D'Augustine, J., Sabita, M., & Bellevue, R. (2007). Bone mass density in adults with sickle cell disease. *British Journal of Hematology, 136*, 666-672.

Aims: To examine the incidence and factors predisposing sickle cell disease (SCD) patients to low bone mass.

Source: Chart review and questionnaire.

Sample: N = 103 participants, female N = 73 or 70.9%, male N = 30 or 29.1%, age 15-80 years.

Ethnicity: Mostly African American.

Measures: Sex, age, BMI, hemoglobin level (Hb), hemoglobin electrophoresis, ferritin, DXA results.

Findings: Low BMD (N = 45 or 43.7%), very low BMD (n = 37 or 35.9%), normal (N = 21 or 20.4%). No significant difference between groups in sex or age. The higher the body mass index (BMI), the lower the likelihood of developing low BMD. Higher ferritin levels may increase the risk of lower BMD. Low hemoglobin levels were the strongest single predictor of low BMD. Alcohol and cigarette smoking were not significant risk factors for the development of low BMD.

Limitations: Possible selection bias; not all patients in the study filled out the questionnaire; other factors not introduced as possible contributors to results included socioeconomic status, health awareness, educational level, and severity of illness.

Sattin, R. W., Easley, K. A., Wolf, S. L., Chen, Y., & Kutner, M. H. (2005). Reduction in fear of fall through intense tai chi exercise training in older transitionally frail adults. *Journal of American Geriatrics Society, 53*, 1168-1178.

Aims: To compare two programs: a Tai Chi (TC) vs. a wellness education (WE) to examine which decreased fear of falling (FOF) more in a sample of community-dwelling elderly from independent living facilities in metropolitan Atlanta transitioning to frailty.

Source: A 48-week, randomized, controlled trial with 2 groups: TC, wellness education with data collection at baseline and every 4 months for a total of 48 weeks.

Sample: N = 311, with 158 randomized to Tai Chi and 153 randomized to control. Men = 20, women = 291.

Ethnicity: White = 178; non-White = 39. Most non-depressed (233); education greater than high school = 245.

Measures: Fear of falling (modified FES, and ABC scales) were the dependent variables; demographics, depression (CES-D), gait speed (10 meter walk < or > than 0.97 m/s), activity level (self-report of 1 hour/week), functional reach (measured distance < or > 10 inches), use of sedatives and number of falls (self-report); Mini-Mental State Exam (cognition).

Findings: Study completed by 217, with mean ABC scores similar in both groups at randomization but significantly better (higher) in the Tai Chi groups at 8 and 12 months. Pattern of observed change in FES mean scores adjusting for covariates significantly better in the intervention group vs. control group, especially at 12 months. Intervention effect for Whites, not African Americans, regardless of gait speed; African Americans showed greater fear of falling. Fall events were defined.

Limitations: Sample and number of African Americans small; data not collected past 48 weeks (unknown if changes will persist); attrition; low male participation; cannot generalize findings.

Schuurmans, H., Steverink, N., Lindenberg, S., Frieswijk, N., & Slaets, J. P. (2004). Old or frail: What tells us more? *The Journals of Gerontology: Series A, Biological Sciences and Medical Sciences*, *59*, 962-965.

Aims: To examine if frailty predicted negative outcomes better than age.

Source: Questionnaire.

Sample: N = 3,000 community-dwelling elderly from the Netherlands.

Ethnicity: Danish nationality but race unspecified and assumed to be White.

Measures: Frailty (Groningen Frailty Index); age (continuous variable); self-management abilities (Self-Management Ability Scale-30).

Findings: Forty-five percent of 1,338 returned the questionnaire. Frailty was better than age when self-management ability was the main outcome measure. Using stepwise regression, chronological age, and frailty significantly correlated ($r = .32$, $p < 0.001$). Frailty significantly negatively correlated to overall SMA and all SMA. Chronological age was negatively related to SMA, most SMA but not with a positive frame of mind. Chronological age added little once frailty included for all outcomes.

Limitations: Findings limited to sample; may not be applicable to all Danes; questionnaire/self-report measures only.

Schwarz, D. F., Grisso, J. A., Miles, C. G., Holmes, J. H., Wishner, A. R., & Sutton, R. L. (1994). A longitudinal study of injury morbidity in an African-American population. *JAMA: The Journal of the American Medical Association, 271*(10), | 755-760.

Overview: Unintentional injury is the leading cause of death between ages 1-44, especially in African Americans who are urban residents and of lower socioeconomic status, experiencing overcrowded living arrangements.

Source: Prospective study of emergency room records.

Sample and Ethnicity: PIPP (Physical Injury Prevention Program), a surveillance of fatal and non-fatal injuries in African American populations in West Philadelphia of 68,000+ people from 1987-1990. Cases are residents of area defined by 17 census tracts, injuries are classified by ICD-9 codes and E codes, and included information from 11 EDs.

Data: Obtained from chart extraction by trained abstractors, with an RN trained in quality control using 2 methods to ensure accuracy.

Findings: Only reported results that affect the elderly population, falls made up 22.6% of all injuries year one and 20.5% in 1990; 80 years and older rates increased by almost 12.7% during the 4 years. Falls made up 24.8% of admissions, women age >80 had high fall rates (58.7 falls/1000 women in the population); 90% of those falling had at least 1 additional ED visit for a fall.

Limitations: Same results may not be found if population were of different ethnic/racial/socioeconomic mixture. Denominator based on 1980-1990 results and may be undercounted in minority populations. Other studies done may show different rates due to sensitivity in case ascertainment or interpretation of ED data.

Seematter-Bagnoud, L., Santos-Eggimann, B., Rochat, S., Martin, E., Karmaniola, A., Aminian, K., Pilot-Ziegler, C., & Bula, C. J. (2010). Vulnerability in high-functioning persons aged 65 to 70 years: The importance of the fear factor. *Aging Clinical and Experimental Research, 22*, 212-218.

Aims: To examine whether fear of falling is associated with signs of early frailty independent of gait performance and fall history.

Source: A cross-sectional, correlational study.

Sample: N = 861 community-dwelling males and females age >65 and enrolled in the Lausanne cohort of the Lc65+ study.

Ethnicity: Swiss nationality; presumably all Caucasian.

Measures: Socioeconomic status, educational level, self-rated health, chronic diseases (from a list of 12), physical activity, fall history over the past year, depressive symptoms, difficulties/help needed with instrumental activities of daily living (IADLs), gait over 20 meters (Physilog), falls efficacy (MFES-I), frailty

(Fried's 5 criteria), anthropometrics, maximum grip strength (dynamometer). Persons were classified as robust or vulnerable; non-faller, single faller or multiple faller.

Findings: Frail included 24.7%; those not frail numbered 75.3%. Vulnerable had one (20.2%), two (3.7%), three (0.7%), or four (0.1%) criteria; no one had all five criteria defining frailty. The vulnerable were older, lived alone, with greater comorbidity and depressive symptoms; were more likely cognitively impaired (3.4% vs. 1.6%) with greater likelihood of functional impairment, fall history in past year, lower falls efficacy scores and slower gait speed. Vulnerable (43.3%) had lower falls efficacy vs. robust (19.1%, $p < .001$); slower speed (1.07 +/- .18 vs. 1.15 +/- .15) and increased variability in speed (4.10 +/- 4.03 vs. 3.33 +/- 1.45, $p < .001$).

Limitations: Small subsample had gait measurements and this was the subsample used for the study, excluding 8.1% of participants; imputation of missing data on frailty may have resulted in misclassification or underestimation of frailty status; heterogeneity of the vulnerable group; problems associated with establishing causality with cross-sectional studies.

Shabas, D., & Heffner, M. (2005). Multiple sclerosis management for low income minorities. *Multiple Sclerosis, 11*, 635-640.

Aims: To evaluate the adequacy of care given to Independence Care System (ICS) enrollees with multiple sclerosis (MS).

Source: A survey of members of the ICS database.

Sample: N = 92 members with multiple sclerosis out of 600 total ICS members; females N = 81%, males N = 19%.

Ethnicity: Minority women made up 77% of this population (46% African American, 31% Hispanic/Latino), 23% Caucasian. Minority men made up 67% of this population (39% African American, 28% Hispanic/Latino), 33% Caucasian. Age range was 21-71 with 68% age <50.

Measurements: A 25-question survey with questions broken down into categories assessing specialist contact, immunomodulation treatment and osteoporosis screening, management and prevention. Other factors include: gender, race/ethnicity, level of disability, disease duration, age, and MS care.

Findings: In this population, 32% never saw a specialist, many could not name their neurologist, and several thought erroneously that house staff were MS specialists. Thirty-two percent were not taking immunomodulation medications at survey assessment time, 47% were prescribed these medications but stopped taking them; of the 53% never treated with immunomodulation medications, 56% refused them (fear of needles, fear of side effects, and lack of belief in medications). Osteoporosis risk factors included being on steroids, nonambulatory status and being postmenopausal. Forty-one percent of women and 25% of men were given calcium supplementation; 18% of women and 19% of men were on Vitamin D supplementation; 57% of women and 78% of men did not have a DXA scan; 34% of women and 40% of men who had DXA were given a diagnosis of osteoporosis, and 53% were not treated despite 84% of members reporting balance difficulties, 61% having a fall history, and 17% having a fracture history.

Limitations: Small study sample size, one-time questionnaire survey, self-report only.

Shadlen, M. F., Larson, E. B., Gibbons, L., McCormick, W. C., & Teri, L. (1999). Alzheimer's disease symptom severity in blacks and whites. *Journal of the American Geriatrics Society, 47*, 482-486.

Aim: To examine the difference in severity of Alzheimer's Disease (AD) and vascular comorbidity.

Source: A cross-sectional comparative study.

Sample: Age >60, from a Seattle, WA HMO. N = 453.

Ethnicity: African Americans N = 38; Whites N = 453.

Measures: Demographics; Mini-Mental State Exam (MMSE); Blessed Dementia Rating Scale (BDRS); health history including atherosclerotic risk factors, time of onset of diagnosis; age at study enrollment; physical examination; neuropsychological testing.

Findings: African American cases of AD were younger but not significantly different in terms of gender, marital status, or income. Earlier age of onset observed for African Americans but with similar duration of disease burden. Lower MMSE scores in African American cases compared to Whites (17.7, 95% CI, 15.9-19.4) than White cases (mean MMSE 20.3 95% CI, 19.8-20.8). Controlling for age and impaired activities of daily living, mean MMSE scores were as follows: 18.1 (95% CI, 16.8-19.4) for Blacks and 19.8 (95% CI, 19.4-20.2) for Whites. No longer were disease duration, age, and gender confounders once age and activity impairment were controlled.

Limitations: Very small number of African Americans in this study; despite low numbers of African Americans, high numbers with hypertension (56%) compared to Whites (34%), cardiovascular disease (22% vs. 26%), myocardial infarction (13% vs. 6%), and stroke (6% vs. 4%); possible bias in assessment instruments.

Shapiro, A., & Melzer, I. (2010). Balance perturbation system to improve balance compensatory responses during walking in old persons. *Journal of Neuroengineering and Rehabilitation, 7*, 32.

Aims: To develop the Balance Measure and Perturbation System (BaMPer System) of sensing alterations in balance control when controlled perturbations are introduced.

Source: Not a study but a description of methods used in design of the measurement instrument.

Sample: Elderly males and females; no other information provided.

Ethnicity: Not addressed.

Measures: Postural/balance perturbations at pelvic base and base of support (the feet).

Findings: Provided a direct method of measuring even slight, compensatory movements during upright walking with the protection of a safety harness attached to the participant, communicated between PC and controller.

Limitations: N/A.

Shaw, F. E. (2002). Falls in cognitive impairment and dementia. *Clinics in Geriatric Medicine, 18*, 159-173.

Aims: To present data from previous studies of falls in elderly patients with cognitive impairment that identifies factors putting them at increased risk so that they can be modified to prevent further falls; to identify areas that need further research.

Source: A narrative literature review.

Sample: Cognitively impaired, elderly with cognitive impairment.

Ethnicity: Not specified. The author referred to prevalence in the United Kingdom and did not mention race thereafter.

Measures: Factors affecting postural instability including medications, orthostatics, carotid sinus hypersensitivity, balance and central processing.

Findings: Impaired cognition increases risk for falls. Most studies were based on those elderly without cognitive impairments and suggested that increasing physiotherapy may help those with cognition problems.

Limitations: Criteria for acceptance or rejection of studies not established; search criteria not established.

Shulman, K. I., Shedletsky, R., & Silver, I. L. (1986). The challenge of time: Clock-drawing and cognitive function in the elderly. *International Journal of Geriatric Psychiatry, 1*, 135-140.

Aims: To compare the clock drawing test (CDT) to the Mini-Mental State Exam (MMSE) and the Short Mental Status Questionnaire (SMSQ) on its ability to identify the cognitively impaired elderly.

Source: Cross-sectional, correlational study.

Sample: N = 75 elderly aged 65 and older, with mean age 75.5 years. Males N = 37; females N = 38. Included in this study were those with normal, organic, and major affective disorders from Sunnybrook Medical Center, Toronto, Canada; those with normal cognition were from the Family Practice Unit.

Ethnicity: Not addressed in this study.

Measures: Standard drawing of a clock on a predrawn circle with instructions to represent the time as 3 o'clock; MMSE; the Short Mental Status Questionnaire or SMSQ (10 questions assessing moderate to severe cognitive impairment); Geriatric Depression Rating Scale (GDRS) consisting of 30 questions assessing normalcy, moderate and severe depression. Oral questionnaire administration for those requiring it with 2 blinded, independent raters assessing level of errors from 1-5, with level 1 errors being the least impaired and level 5 errors being the most impaired.

Findings: MMSE and SMSQ were correlated ($p < .0001$) with a correlation coefficient of .86. Errors on the CDT were significantly correlated with the MMSE ($p < .0001$; -.065) and SMSQ ($P < .001$; -0.66). High scores on CDT indicated greater severity of impairment, the opposite of the other instruments—hence the negative correlations. Comparison of the CDT to SMSQ with level 2 errors as the cut-off resulted in a sensitivity of .84 and a specificity of .70. False positive ratio was 45.5% and false negative ratio was 7.1%. Comparing the CDT to the MMSE, results were sensitivity of .86 and specificity of .72. The author gave no other data on whether the false positive or false negative ratio changed.

Limitations: Small sample size; one of the instruments (SMSQ) only assessed moderate to severe cognitive impairment; ethnicity not addressed as a possible factor affecting.

Silverman, M., Nutini, J., Musa, D., King, J., & Albert, S. (2008). Daily temporal self-care responses to osteoarthritis symptoms by older African Americans and Whites. *Journal of Cross-Cultural Gerontology.* doi:10.1007/s10823-008-9082-6

Overview: Osteoarthritis (OA), the most common type of arthritis, with no cure except to treat symptoms of pain, stiffness, and limited mobility so that sufferers can continue their lifestyle with as little disruption as possible. People adapt their care regimen to meet their self-care needs on a daily, temporal basis. Coping varies by race, gender, and severity of symptoms. What is self-care? Two definitions given but Dean is cited with the most concise as behaviors undertaken to meet individual self-needs in health maintenance to paraphrase. Identified gaps in research: few studies of illness behaviors over time and none on management during a typical daily basis.

Source: A descriptive/qualitative, correlational, comparative study.

Sample and Ethnicity: N = 551, African Americans and Whites residing in Allegheny County, PA, aged >65, community-dwelling, no cognitive impairment, surveyed for eligibility from a randomly drawn sample of people from Medicare Enrollment File as of April 2001. They had to meet the above criteria and either had pain in the hip or knee most days for minimum of a month, pain walking or standing half the days of the past month, and pain of the same severity at least 6 months. Participants answered 5 systematic, descriptive questions in a total of 4 interviews over 36 months, with responses recorded for coding.

Variables: One of 6 categories (medications, topicals, movement, limited activity, diet, alternatives). Other measures: demographics (age, gender, race, education, marital status, severity of symptoms), health status (self-reported via SF-36, which measures quality of physical and mental health).

Findings: On a typical day, African Americans were more likely to use medications (68.7%), topicals, activity limitation, movement, dietary change, and home remedies. African Americans with more severe symptoms used more medications. Both groups used movement first thing in the morning, with exercise being used less as the day progressed. With worsening pain, both groups decreased activity or rested. There was a difference between the races when asked what each group did during the day when pain increased. African Americans rested less than Whites but medicated more. Topicals, especially at night time and movement, were used by AAs more than Whites. AAs were more likely to use prayer and less likely to change their diets or use supplements.

Limitations: Emic perspective focused, certain factors like mealtimes or change in the usual routine not explored. Due to the nature of the study, when replicated, consistency of coding may be at issue.

Simpson, J. M., Darwin, C., & Marsh, N. (2003). What are older people prepared to do to avoid falling? A qualitative study in London. *British Journal of Community Nursing, 8*, 154-159.

Aims: To report on a study looking at precautions elderly take to prevent falling.

Source: A qualitative study.

Sample: N = 32 with females = 26, males = 6; mean age 83 (SD5.3) years; participants able to walk 3 meters independently with or without assistive device and able to cooperate with tests and interviews.

Ethnicity: Not specified.

Measures: Semistructured interviews using progressive focusing until saturation with information lasting approximately an hour in length, hand transcribed.

Findings: Three areas of interest (taking care, willingness to exercise, and home safety checks). Taking care involved being vigilant of danger and avoiding it, use of supports for holding on, slowing the pace, knowing limitations, and having awareness that care requires effort and certain things are chance or fate. Willingness involves awareness of benefits of exercise, barriers need effort to be overcome, concern over age-appropriateness of actions, and some acts may be painful. Home safety incurs willingness to allow a certain level of intrusiveness and change that may trigger negative feelings about a past event that needs to tempered with the realization that safety at home is a priority.

Limitations: Causation cannot be implied due to the nature of the study; small sample size; may not generalize the findings to larger or more diverse group of elders.

Soriano, T. A., DeCherrie, L. V., & Thomas, D. C. (2007). Falls in the community-dwelling older adults: A review for primary care providers. *Clinical Interventions in Aging, 2*, 545-554.

Aims: To examine factors associated with falling.

Source: A literature review.

Sample: Community-dwelling elderly.

Ethnicity: Not specified.

Measures: N/A.

Findings: Factors contributing to falls in the elderly included sensory deficits (visual, hearing, vestibular, and proprioceptor disturbances), muscular-skeletal deficits associated with the aging process, environmental factors, medications, and postural hypotension. Assessments that should be done prior to a fall incident and post-fall incident are addressed. Prevention centered on multiple components and included addressing physical deficits through strength and balance-increasing exercises, modifying environment, and addressing issues identified in the risk factor assessments done by providers.

Limitations: Very broad-based review; small mention of community-dwelling elderly with cognitive impairment.

Srygley, J. M., Herman, T., Giladi, J. M., & Hausdorff, J. M. (2009). Self-report of missteps in older adults: A valid proxy of fall risk? *Archives of Physical Medicine and Rehabilitation, 90*, 786-792.

Aims: To examine the relationship between missteps and falls and to study the relationship between missteps and factors associated with fall risk.

Source: Prospective observational study.

Sample: N = 266 males and females who were participants in a prospective study of the relationship between gait and cognitive function. Participants were community-dwelling aged 70-90, free of diseases that impact gait, cognitively intact, and able to ambulate independently.

Ethnicity: Not specified.

Measures: Done via phone interview and 3-hour evaluation that included a neurological exam, cognitive assessment, clinical testing. Cognitive assessment was done using Mindstreams, a computerized neuropsychological test. Performance-based tests of balance/mobility: Berg Balance Test, Dynamic Gait Index, Timed Up and Go, Pull Test. Affect and balance confidence: ABC scale, Geriatric Depression Scale (GDS), Spielberger State Trait Anxiety Inventory.

Findings: Fifty-five or 20.7% had at least 1 misstep, with 25.6% reporting at least 1 fall at prospective follow-up. Number of missteps was positively correlated with prospective fall reports. Those with multiple missteps were more likely to fall prospectively (RR = 3.89). Among those with both multiple missteps and falls, those with multiple missteps outnumbered falls by a 3:1 ratio ($p < .001$); GDS scores and State Trait Anxiety Inventory Scores were significantly correlated with missteps. Prospective falls not correlated with GDS scores ($p > .48$) or anxiety measures ($p > .20$).

Limitations: Self-report of missteps with no objective or third-party assessment; missteps may be underreported secondary to falls being more memorable; those with fall history may be extra careful and may remember missteps more than those who did not fall.

Stack, E., & Ashburn, A. (1999). Fall events described by people with Parkinson's disease: Implications for clinical interviewing and the research agenda. *Physiotherapy Research, 4*(3), 190-200.

Aims: To describe and define terms used by people with Parkinson's disease when describing falls and near-falls experiences.

Source: A cross-sectional study that was part of a larger study.

Sample: N = 55, community-dwelling, independent elderly with Parkinson's disease. Men = 27, women = 28, mean age 71.5 years.

Ethnicity: Not described.

Measures: Number of falls and near falls in the past year, what happened during the fall or near fall.

Findings: Attempts to recover balance were described. Patients described their feet as non-moving and falls caused by weakness or a medication. There were 34 falls (62%) and 41 near-falls (75%) in the past year.

Limitations: Small sample size, correlational, cross-sectional design limits generalization of findings to a limited population.

Steinman, B. S., Pynoos, J., & Nguyen, A. Q. (2009). Fall risk in older adults: Role of self-rated vision, home modifications, and limb function. *Journal of Aging Health, 21*(5), 655-676.

Participant Characteristics: N = 8,449 aged 74.1 years; females were older, males more educated; 90.6% were White, 6.8% were African American, 2.5% were other. Study design: secondary data analysis from 2004 and 2006 panels of the University of Michigan HRS Study.

Variables/Tools: Dependent variables of falls in the past 2 years (not defined in the original study). Independent variables: sociodemographics, ULF/LLF (upper-limb function and lower-limb function via 11 activities, self-report of difficulty performing), home modification in the past 2 years, depression (CES-D), hearing, medications, alcohol (self-report); the following interactions: visual status x change in ULF/LLF, self-report of medical conditions.

Findings/Limitations: Females were: more likely to fall, rate vision as poor, modify homes, be depressed, and have psychiatric problems, HTN, arthritis. Age was significant as a predictor of falls across models. Education and race were significant predictors of falls in women, with African American women 29% less likely to fall. Add 4%/year of added education. Each added difficult with ULF increased the likelihood of falling by 21%; LLF increased fall likelihood by 16%. Males: poor-fair vision was significantly associated with falls, controlling for all limb function, effect of vision disappeared. No significant interactions seen. Significant predictors of falls across models were changes in function of limbs, diabetes, psychiatric impairments, and depression.

Limitations: Falls were not defined, cognitively impaired were excluded, long period of recall (2 years), findings could not be generalized.

Stevens, J. A., & Sogolow, E. D. (2005). Gender differences for nonfatal unintentional fall-related injuries among older adults. *Injury Prevention, 20*, 185-194.

Aims: To examine gender differences in falls among elderly in the U.S.

Source: A data analysis from National Electronic Injury Surveillance System All Injury Program (NEISS-AIP) from January-December 2001.

Sample: Elderly aged >65 in the United States treated in emergency departments, N = 22,560.

Ethnicity: Not specified.

Measures: Emergency room diagnosis codes from a nationally representative subsample of 66 out of 100 NEISS hospitals selected as a stratified, probability sample of hospitals.

Findings: 1.6 million older adults were treated in emergency departments (EDs) for unintended fall-related injuries, with 70.5% of them being women. Rates of injury increased with age, with rates for elderly aged 85 and above 4-5 times that of elderly aged 65-69. Fractures accounted for 37.8% of women’s and 28.3% of men’s injuries, with rates for fractures 2.2 times higher than they were for men. For all parts of the body, the injury rate for women exceeded the rate for men. The highest rates were seen for head/neck injuries among men and women. Approximately three quarters of all patients seen for fall-related injuries were treated and released; only 1 out of 5 were hospitalized, with the hospitalization rate for women 1.8 times that for men. The rate of hospitalization for women was 2.3 times higher for women for fractures and 2.1 times higher than men for lower trunk injuries. Rates of fall-related injury diagnoses increased with age, rates doubled for all injury diagnoses with each decade of age, with women’s injuries for each age group and for all body parts exceeding men’s. With each decade of age, the hospitalization rate for both genders increased 2.7 times.

Limitations: Ethnic breakdown not done, no follow-up data.

Stevens, J. A., & Dellinger, A. M. (2002). Motor vehicle and fall related deaths among older Americans 1990-98: Sex, race, and ethnic disparities. *Injury Prevention, 8*(4), 272-275.

Overview: Leading cause of death among age >65 are motor vehicle accidents (MVAs) and falls. In 1998: 30,605 deaths from unintentional injuries; 7,886 from MVAs; 9,604 from unintentional falls.

Source: Observational, descriptive study, whose purpose is to report motor vehicle and fall-related deaths.

Independent Variables: Sex, race, and ethnicity differences.

Dependent Variables: Motor vehicle and fall-related deaths from 1990-1998.

Methods: Examination of death certificates as they were reported per ICD-9 (International Classification of Diseases, 9th revision) and E-codes (external injury codes) from 1990-1998 based on data obtained from the National Center for Health Statistics annual mortality tapes from the National Center for Health Statistics classifying these deaths by race (White, Black/African American, American Indian/Alaskan Native, Asian/Pacific Islander, Hispanic/NonHispanic).

Findings: Regarding motor vehicle deaths and sex: males' death rate was higher; regarding race, White males' and Asian males' rates were lowest, Black and American Indian men highest; black women had the lowest, Asian women highest, with Hispanic women always lowest than non-Hispanic. Lacking data for American Indian women were dealt with by averaging rates, but still resulting in great variability when comparisons done among races. Regarding falls: death rates were higher among Whites, non-Hispanics. Death rates for White females almost double that of women of other races. The rates of death for MVAs were stable during the study period, but the rates of death for falls during the same period increased, with the death rates for Blacks being about half that of Whites.

Limitations: People may have been misclassified by race or ethnicity, especially for Hispanics and American Indians, who may have been mislabeled as being White. Three states did not note ethnicity in during the study period. Of note was the smoothing technique in which the 3-year death rate was calculated in cases that had very small numbers such as American Indian and Asians.

Steverink, N., Slaets, J. P., Schuurmans, H., & van Lis, M. (2001). Measuring frailty: Developing and testing the GFI (Groningen Frailty Indicator). *Gerontologist, Special Issue*, 236-237.

Aim: Testing the psychometric properties of the instrument.

Source: Instrument development study.

Sample: N = 275; age >65, included hospital and nursing home patients, community-dwelling elderly from the Netherlands.

Ethnicity: Not specified but assumed to be White.

Measures: Factor analysis of 22 items on the Groningen Frailty Indicator; self-rated health (5 items); general health questionnaire (GHQ).

Findings: Frailty could be measured using 12 items, but 15 were selected for an internal consistent and unidimensional instrument with a Cronbach's alpha of .77. Construct validity measured using means of self-rated health among the highly frail or those scoring >5 were 12.7; mean general health questionnaire score indicating highly frail or scoring >5 were 27.4; means of self-rated health among those showing low frailty or scores <4 were 17.6 and for GHQ were 21.7 as indicators of construct validity. For interrater reliability, agreement from 3/4 experts was obtained on frailty in 60% of cases, with agreement from 2/4 experts on the remaining 40% of cases.

Limitations: Small sample size; limitation of findings to Danes; no physical measures of frailty, only self-report instruments.

Strawbridge, W. J., Shema, S. J., Balfour, J. L., Higby, H. R., & Kaplan, G. A. (1998). Antecedents of frailty over three decades in an older cohort. *Journal of Gerontology: Social Sciences, 53B*, S9-S16.

Aims: To examine longitudinally the predictors of frailty and prevalence of frailty in community-dwelling elderly.

Source: A cross-sectional analysis of a longitudinal study of data from the Alameda County Study.

Sample: N = 574 men and women age >65 who were interviewed starting in 1965 and subsequently in 1974, 1983, 1994 and 1995. Males = 247, females = 327.

Ethnicity: Whites = 82%, Blacks = 10%, Asians = 3%, Hispanics = 3%.

Measures: Frailty (physical functioning, nutritive functioning, sensory and hearing problems); alcohol and tobacco intake (number of drinks/month; current smoker/ never smoked); obesity (BMI >27.3 for females and BMI >27.8 for males classified as obese); physical inactivity (frequency of exercise, long walks, swimming or active sports); depression (a score >5 on the instrument developed by Roberts and O'Keefe); social isolation (having <3 close friend/relatives, seeing <3 friends/ relatives in the past month); self-perceived health status (fair/poor vs. good/ excellent); number of chronic illnesses/conditions (self-report of heart troubles, bronchitis, hypertension, asthma, stroke, trouble breathing, arthritis, diabetes, cancer, swollen ankles, back pain, constant cough, frequent leg cramps, coughing/colds, stiff joints, tiredness in short time); quality of life (entertainment out, visiting, attendance at religious services); life satisfaction (enjoyment of free time, feeling loved, satisfied with relationships); self-assessment of mental health (fair/poor vs. excellent/good); happiness (very/pretty vs. not too happy); depression (Roberts/ O'Keefe scale).

Findings: Frail subjects numbered 150/574 or 26.1%, with the largest number found in the group aged 85 and above (48.8% vs. 18.3% in the 65-69 age groups). Males more likely had problems with hearing and all items on the cognitive assessment, while females had problems with reading questions and nutritive domain. One fourth of the subjects in the Alameda County study were identified as frail. Risk factors associated with frailty include physical inactivity, depression, fair/poor self-perceived health status were associated with frailty. The non-frail were more likely to be active socially, visit social contacts, be satisfied with life and free time, feel loved, and have better mental health.

Limitations: Small number of participants; small representation of minorities for analysis in all waves; long period of time between measurement periods.

Strotmeyer, E. S., Cauley, J. A., Schwartz, A. V., Nevitt, M. C., Resnick, H. E., Bauer, D. C., Tylavsky, F. A., de Rekeneire, N., Harris, T. B., Newman, A. B. (2005). Nontraumatic fracture risk with diabetes mellitus and impaired fasting glucose in older white and black adults: The health, aging, and body composition study. *Archives of Internal Medicine, 165*(14), 1612-1617.

Goals: To examine whether having diabetes is associated with greater risk of fracture for Blacks and Whites; to determine whether people who have diabetes and fractures are similar to those without diabetes and fractures.

Overview: People who have diabetes tend to be Black and have increased BMI. Increased BMI is associated with increased BMD (bone mineral density) but people with diabetes have a higher risk of fracture compared to people without diabetes. This type of diabetes is more prevalent in African Americans, but most research exists on elderly Whites, particularly females. What is unknown is what factors contribute to higher fracture risk in elderly diabetics, mostly AAs, even though they have higher BMD and body weight. These factors are supposed to be protective. Prior research suggests that medications, duration of disease, and complications may play some role.

Variables: Incident, nontraumatic fractures confirmed by x-rays was the dependent variable; independent variables were height, weight, total hip BMD, BMI, abdominal CT measuring abdominal visceral fat, spinal CT done in Pittsburgh for bone volume and volumetric trabecular BMD, health histories, medication histories, weight gain or loss over the year, diabetic complications, ankle-brachial index (measure of subclinical heart disease).

Sample and Ethnicity: N = 3,075, with 96 excluded for having childhood onset diabetes, no diabetes or IFG (impaired fasting glucose) status, on steroids, leaving N = 2,979. White males = 914, White females = 816, Black males = 542, Black females = 707, all age 70-79 years and in the Health, Aging and Body Composition Study (Health ABC).

Methods: Recruitment was by random sampling from a mailing to White Medicare recipients and members of the Black community who fit into the age category requirement from Pittsburgh, PA and Memphis, TN. Participants had to be able to give consent, have a baseline examination in 1997-1998, no difficulty walking, performing ADLs, no life-threatening cancers in the past 3 years, and be committed to the study for a minimum of 3 years. Definition of diabetes was a self-report from the patient as diagnosed by a doctor, being on hypoglycemic medications, a FPG (fasting plasma glucose) 126 and greater. Patients who were not diabetic had to have FPGs of less than 110. Clinic measures were a 75g GTT (glucose tolerance test), fasting insulin and glycosylated hemoglobin. Every six months patients were asked to report a fracture and such was confirmed by x-ray. Nontraumatic fractures were of interest, not traumatic fractures and a definition of such was given.

Statistics: Incidence calculated per 1000 person years. Pearson X2: difference in prevalence, univariate association between DM or IFG and nondiabetics; Fisher's exact; 1 way Mann-Whitney test; Cox proportional hazards regression.

Findings: Black males had the highest prevalence of diabetes, followed by Black females, White males, and White females. Diabetes increased the risk of fractures. Both races of men and women with diabetes had higher BMDs, higher weight, BMIs, lean mass, fat mass, visceral fat, fasting insulin level (p. 1614). Blacks took insulin more than Whites, but no race differences existed on the use of oral hypoglycemics. Diabetic women were more likely to have fractures. Some factors that may have influenced falls in the diabetics include: diminished sensation, increased vulnerability to transient ischemic attack or stroke, decreased visual acuity, lower scores on physical assessment tests. The authors cited a past study in which duration of having diabetes was associated with falls. The longer participants had the disease, the more likely they were to have a fracture.

Limitations: Researchers did not know why they were unable to relate duration of diabetes to fracture risk and speculate that the inability to make the relationship may be due to the fact that there was a narrow age range in their sample, therefore leaving that as a research question to be answered by another future study. They noted that persons with subclinical fractures were not included here; those included in their study were higher-functioning elderly adults with diabetes. Their results may have changed if those who were not as highly functional had been included in the study.

Sturnieks, D. L., St George, R., & Lord, S. R. (2008). Balance disorders in the elderly. *Neurophysiology Clinique, 38*, 467-478.

Aims: To update on balance disorders affecting elderly and the relationship to falls.

Source: A literature review.

Sample: Elderly age >65 years.

Ethnicity: Not specified.

Findings: Declines in vision, reaction time, vestibular balance, and how these declines are linked to illnesses and changes in the body that naturally occur as part of the aging process were addressed. Interventions that may improve balance in this population were also addressed and included home-based group exercises and interventions to address visual deficits.

Limitations: Assessment of how studies selected for inclusion.

Suzuki, M., Ohyama, N., Yamada, K., & Kanamori, M. (2002). The relationship between fear of falling, activities of daily living and quality of life among elderly individuals. *Nursing and Health Sciences, 4*, 155-161.

Aims: To examine the relationship between fear of falling (FOF) and functional disability and health-related quality of life (HRQOL) in potentially homebound/ bedridden elderly using Day Service.

Source: An observational study from July 26-August 1, 1999.

Sample: N = 142; males N = 43; female N = 92.

Ethnicity: Japanese natives.

Measures: Activities of daily living or ADLs (level of assistance required for bathing, eating, walking, dressing, toileting); FOF (are you very fearful, somewhat fearful or not fearful?); falls (experiences of falls in the past year); HRQOL (Japanese version of SF-36).

Findings: Those who were fearful of falling N = 22 or 16.3%, those without fear of falling N = 49 or 36.3%. Females more likely to be very fearful compared to males (19.5% vs. 9.3%), with women aged 60-69 (66%) most likely expressing fear. Assistance with dressing and toileting was statistically significantly associated with FOF ($p < .1$). For females, walking and bathing were significantly associated with FOF. Among elderly females, limb impairment and falls in the past were significantly associated with FOF ($p < .05$). Visual impairment associated with FOF ($p < .01$). Participants having a fall experience in the past year 46.4% of females were very fearful and versus 14.2% of males. With regards to gender, FOF and HRQOL, males without FOF had higher scores in physical problems and social function than those with moderate FOF. Females who reported no fear of falling had higher scores in physical function, social function, physical function, general health and vitality than those who were moderately or very afraid of falling ($p < .05$).

Limitations: Small sample size; observational study; self-report instruments; no validity/reliability reports on instruments used; findings may be unique to sample; no description of how they compare to the population from which the sample was obtained.

Talbot, L. A., Musiol, R. J., Witham, E. K., & Metter, E. J. (2005). Falls in young, middle-aged and older community dwelling adults: Perceived cause, environmental factors and injury. *BMC Public Health, 5*, 86.

Aims: To examine activities, environment, and perception leading up to falls in young, middle-aged, and older adults.

Source: A descriptive, correlational study.

Sample: N = 1,497 volunteers from the Baltimore Longitudinal Study of Aging, a prospective study of the National Institute on Aging (NIA). Participants age 59.5 +/- 16.5 years, 50.6% male, 75.9% college graduates, 66% married, 53.9% with BMI >25, negative for depression and in good health.

Ethnicity: 72.1% Caucasian.

Measures: Physical activity (self-report over past 2 years converted to metabolic equivalents of resting oxygen consumption); BMI; depression (CES-D); fall history (History of Falls questionnaire), activities prior to the fall, perceived causes of falling, environmental factors, injuries and location of the fall.

Findings: Twenty-six percent fell in the past 2 years, with 18.5% of falls in young adults, 21% in middle-aged adults, and 35% in older adults. Significant differences found in males and females and between age groups. Older men and women were more likely to report a fall in the previous 2 years than young men and women. The activity causing falls most frequently was ambulation across all groups. The young fell while running and outdoor activities with injuries to wrists/hands/knees/ankles while the older adults injured their head and knees and were more likely to be injured while indoors. Women in the youngest group reported more injuries than any other group. Causes of falls were either balance/gait impairment or accidents-/ environment-related. As age increased, balance/gait disturbances as the cause of falls increased.

Limitations: Cross-sectional design, reliance on self-report of injury, use of memory to recall falls over 2 years.

Talley, K. M., Wyman, J. F., & Gross, C. R. (2008). Psychometric properties of the activities-specific balance confidence scale and the survey of activities and fear of falling in older women. *Journal of the American Geriatrics Society, 56*(2), 328-333.

Participant Characteristics: N = 272 community dwelling women aged >70; N = 263 completing the study. Age 76.7 years +/- 4.9. Whites (96.5%); educational levels >high school (56.9%); married (60.3%); income $35,000/year (68%). Upper Midwestern metropolitan area residents.

Study Design: Secondary data analysis of data from a single blind, RCT (FEPP) the Fall Evaluation and Prevention Program. Baseline and postintervention assessment of effects of a 12 week, home-based fall prevention and education program.

Variables/Tools: Dependent variables are internal consistency and concurrent validity of the ABC and SAFE tools. Independent variables are demographics, function (BBT, gait speed, TUG score, use of assistive devices in percentages); depression (GDS); medical conditions, number of falls in the previous year, number of activity restrictions; self-rated health (MOS SF-36); fear of falling (ABC, SAFE).

Findings/Limitations: Internal consistency reliability: Cronbach's alpha at baseline and at 12 weeks for ABC was .95 and .95. For SAFE, at baseline and at 12 weeks was .82 and .84, respectively. Concurrent validity: both tools significantly correlated at baseline and 12 weeks. Construct validity: lower ABC scores significantly correlated with advanced age, lower BBT, gait speed, longer TUG times, and more restriction of activity, higher GDS score, and greater number of falls, chronic illnesses, and assistive device use. Higher SAFE scores significantly correlated similarly except for: age, fall history. Lower ABC scores, higher SAFE scores significantly correlated with lower health status on SF-36. Limits: ceiling effects of tools, mostly White women participants, sample was not fearful, intervention did not influence fear of falling.

Tell, G. S., Lefkowitz, D. S., Diehr, P., & Elster, A. D. (1998). Relationship between balance and abnormalities in cerebral magnetic resonance imaging in older adults. *Archives of Neurology, 55*(1), 73-79.

Overview: Falls are the 6th leading cause of death for elderly people, often disabling with many who survive are left with mobility restrictions and injuries including fractures. Causes of falls are multiple in this age cohort: neurological disorders, age related changes in musculoskeletal systems, sensory deficits. Romberg test and functional reach test have been used as predictors of falls. Positive Romberg test: compares the balance with eyes open and closed; inability to remain balanced with both eyes closed and without visual input. Dynamic positometry: uses a computer to measure balance under six simulated conditions that neutralize visual or surface support references. Lack of research data on relationship between balance, falls, and cerebral atrophy.

Source: Correlational study.

Hypothesis: Older adults with balance problems have a greater prevalence of MR imaging brain abnormalities than older adults without such balance problems.

Variables and Instruments: Dependent variables are the relationship between cerebral atrophy seen on MR imaging and balance; to assess aspects of balance using Romberg test, tandem stand, 1 foot stand, functional reach, and dynamic posturography. Independent variables are on MRI, observation of four things: ventricular size, sulcal widening, white matter disease, and ischemic infarction.

Sample and Ethnicity: N = 775 ambulatory, community-dwelling Whites and Blacks, 452 women (Blacks = 96, Whites = 356) and 323 men (Blacks = 49, Whites = 274). Other measures: tandem stand (standing with heel of either foot in front of or touching the toes of the opposite foot); 1 foot stand test; functional reach: maximum distance reaching forward beyond arm’s length while maintaining a fixed base in a standing position.

Statistics: Chi-square: balance and control variables tested for associated with race and sex; linear correlation used where appropriate; nonparametric analysis; correlation coefficients: relationships between MRI imaging variables and balance variables via zero order correlations; multiple regressions: checking for interactions with sex or race, effect of MRI on each balance variable.

Findings: Even in mild cases of cerebral atrophy, there were greater balance problems than in people without any brain changes. Balance problems increase people’s fear of falling and can result in deconditioning and further disability, confirming findings of previous studies on elderly people with balance and mobility difficulties. Poorer balance associated with greater cerebral disease generally and across sex, race, and coronary heart disease (CHD).

Limitations: Cross-sectional study; limited inferences on associated with balance and cerebral atrophy.

Teno, J., Kiel, D. P., & Mor, V. (1990). Multiple stumbles: A risk factor for falls in community-dwelling elderly. A prospective study. *Journal of the American Geriatrics Society, 38,* 1321-1325.

Aims: To determine if stumbles without a fall history in the past month predicted subsequent falls.

Source: A correlational study with repeated measures at baseline and again at average of 11 months postbaseline assessment.

Sample: A 10% probability sample of Medicare beneficiaries, home dwelling from a Northeast metropolitan city. N = 736 with 67% female, average age 76.5 years +/- 6.9, with a range of 65 to 99.

Ethnicity: Whites = 86%, other = 9%.

Measures: Questions on falls and stumbles in the past month, demographics, social, functional, medical, and psychological information; questions on higher-order activities such as sports, preventive health behaviors, and use of health services.

Findings: Twenty-two percent had one or more activities of daily living (ADL) deficiencies; 63 or 8.6% fell in the past month; 67 or 9.1% had 2 or more stumbles without a fall history in the past month; 10% remained at home more than once weekly; and 16% reported a decline in health status over the past year. Fallers risk increased with age and gender with females experiencing more falls, poor health/vision, use of a cane, history of a fall in the past month, having 2 or more stumbles in the past month without a fall and being homebound. Independent risk factors for a fall included: 2 or more stumbles in the month prior to initial interview controlling for age, sex, race, days bedbound, leaving the home <once/weekly, walking aids, living arrangement, function, health status, and visual impairment. Other independent risk factors for falls included prior fall, spending 4 or more days bedbound in the past month, and a decline in health status.

Limitations: Information based on participant recall, which may result in inaccurate reports. Falls without injury may be forgotten so associations in this study may be with more serious falls. Participants may be less impaired functionally and younger than the general population and be at a lower risk of falls.

Teo, J. S. H., Briffa, N. K., Devine, A., Dhaliwal, S. S., & Prince, R. L. (2006). Do sleep problems or urinary incontinence predict falls in elderly women? *The Australian Journal of Physiotherapy*, *52*, 19-24.

Aims: To examine the association of night-time sleep disturbance, daytime sleepiness, and urinary incontinence to increased fall risk.

Source: A cross-sectional study within a cohort study using participants of the Calcium Intake Fracture Study (CAIFOS).

Sample: N = 782 ambulatory, community-dwelling females.

Ethnicity: Australian ethnicity, race not specified.

Measures: Daytime sleep problems (Epworth Sleepiness Scale, validity/reliability provided); night-time sleep problems (4 questions on problems experienced at night with sleep, with participants rating on a scale of 1-5 how often they experienced these problems; scores of 4 or 5 indicate having a problem); urinary incontinence (Female Incontinence Questionnaire by Ishiko et al., 2000); sensitivities given for types of incontinence; falls and covariates (falls in past 12 months, more than once), calculated BMI, current medications.

Findings: Of the 782 participants, 35.2% fell at least once, 36.4% fell more than once, and fallers were older than non-fallers (79.4 years vs. 78.8 years, $p < 0.005$). 8.1% had abnormal daytime sleepiness; fallers had more daytime sleepiness than non-fallers. Urge incontinence experienced by 36.3% and stress incontinence by 69.4%. Factors associated with falls include urinary incontinence, abnormal daytime sleepiness, trouble waking and getting up in the morning, waking up too early and not being able to fall asleep again. Potential covariates associated with falls included age, CNS, and CVS drugs. Adjusting for potential confounders and using forward stepwise multiple regression, urge incontinence, and abnormal daytime sleepiness were found to be independently associated with increased fall risk.

Limitations: Self-report data only, not verified by any other means; one-time assessment of data.

Thomas, J. A. (2007). Racial and ethnic differences in osteoporosis. *Journal of the American Academy of Orthopedic Surgeons*, *15*, S26-S30.

Aims: To examine the patterns of diagnosis and treatment of osteoporosis in the minority community.

Source: Journal article, review.

Sample: N/A.

Ethnicity: African Americans/Blacks, Hispanics, and Asians.

Measures: N/A.

Findings: The disease affects mostly females but affects males as well. Twenty percent of non-Hispanic Whites and Asians age >50 have osteoporosis; 5-10% of non-Hispanic Blacks and 10-15% of Hispanic women affected. Fractures not as common in African Americans and some subgroups of Asian women age>64, African Americans have excess morbidity/mortality. Disparities in osteoporosis diagnosis and management are due to attitudes (African Americans and Hispanics do not feel the disease poses the same risk as heart disease, diabetes or cancer; mistrust and fear of White-dominated medical system); variation in awareness (minorities may be unfamiliar with behaviors promoting optimal bone mass); inequality in diagnosis and treatment (minorities are less likely to be recommended for screening, prescription and nonprescription medications despite having low impact fractures); genetics/biology (African Americans absorb less Vitamin D due to dark pigmentation; obesity may decrease bioavailability of Vitamin D); predisposing conditions (low socioeconomic status impact exercise pattern as African Americans less likely to go outdoors for exercise; osteoarthritis of knees and hips more commonplace in African Americans as hip and knee replacement less commonplace); African Americans twice as likely to die in first year post-hip fracture, one and a half times more likely to die while in the hospital for hip fracture as well as more likely to be immobile upon discharge).

Limitations: Needs to examine ways providers can expand cultural awareness to care for a changing demographic population in the coming years.

Tinetti, M. E., Richman, D., & Powell, L. (1990). Falls efficacy as a measure of fear of falling. *Journal of Gerontology, 45*, P239-43.

Aims: Development of an instrument to measure fear of falling (FOF) based on self-efficacy or confidence, to test instrument reliability/validity, and to identify characteristics associated with falling.

Source: Instrument development.

Sample: Community-dwelling elderly age between 65-91, with an average of 79. Males N = 4; females N = 14; total N = 18.

Ethnicity: Not specified.

Measures: Psychometric pre-testing in 18 cognitively intact, conveniently sampled elders to examine test/retest reliability response and spread. The 2nd pretest in 56 volunteer noninstitutionalized elderly, average age 78, range 66-89, 75% female, 84% lived alone, and 59% in senior housing. Goal was to compare FES score to reports of FOF, to examine relationships between subject characteristics and FES score. Participants recruited from West Haven, CT senior center and elderly housing unit. Cognitively intact was defined by Short Portable Mental Status Questionnaire of a score of at least 7. Measures of 10 nonhazardous activities essential to independent living per professional consensus were done.

Findings: Correlation between 1st and 2nd testing showed a Pearson's correlation of 0.71. Independent predictors of FOF, evidenced by FES score were walking pace (p < .0001), anxiety ($p < .0001$), depression ($p < .001$).

Limitations: Small sample size; the volunteer participants may have fewer activity limitations that may make generalization to a larger more diverse population difficult.

Topolski, T. D., LoGerfo, J., Patrick, D. L., Williams, B., & Walwick, J. (2006). The Rapid Assessment of Physical Activity (RAPA) among older adults. *Preventing Chronic Disease, 3*, A118.

Aim: Instrument development and comparison of the instrument to Patient Centered Assessment and Counseling for Exercise (PACE) and Behavioral Risk Factor Surveillance System (BRFSS) with Community Health Activities Model Program for Seniors (CHAMPS) as the criteriA.

Source: Systematic review of the literature of current instruments for those age >50; five focus groups; cognitive debriefing.

Sample: N = 115 for the validation portion using seniors from senior centers in King County, WA and Seattle Parks and Recreation Programs.

Ethnicity: Seventy-three percent White; 18% African American, and 9% other.

Measures: Criterion validity, readability, predictive properties.

Findings: Seventy-two percent female, mean age 73.3 +/- 9.6 years; 55% physically active, 80% in some type of physical activity. RAPA was more correlated with CHAMPS in terms of moderate and total calories than BRFSS or PACE. RAPA has a sensitivity of 81%, specificity 69%, positive predictive value 77%, and negative predictive value 75%. All 3 measures (CHAMPS, RAPA, and BRFSS) could discriminate adequate/inadequate model of vigorous physical activity, but RAPA was superior at assessment of mean caloric expenditure.

Limitations: Participants were volunteers at senior centers where exercise was encouraged; cross-sectional nature of the study; no physical measures.

Turano, K., Rubin, G. S., Herdman, S. J., Chee, E., & Fried, L. P. (1994). Visual stabilization of posture in the elderly: Fallers vs. non-fallers. *Optometry and Vision Science: Official Publication of the American Academy of Optometry, 71*, 761-769.

Aims: To examine the role of vision in postural stability, fear of falling, and falling.

Source: A cross-sectional study using questionnaire and physical assessment.

Sample: N = 185, with males = 96, females = 89; age > 65, community-dwelling, participants in Johns Hopkins Functional Status Laboratory. Excluded: those unable to stand without aid >30 seconds; with scores <18 on Mini-Mental State Exam; unable to participate in all phases of study examination.

Ethnicity: Not addressed.

Measures: Falls/fear of falling (questionnaire via interviewers); falls (using standard Kellogg International Group definition); fear of falling (1 question yes/no); postural sway (EquiTest System); center of gravity (estimated); stable/sway referenced support (feedback via servomotor); visual stabilization computation (2 with eyes open/stable support and 2 with eyes closed/unstable support); visual function (Snellen acuity conversion to logMar, Lighthouse ETDRS acuity chart, contrast sensitivity with Pelli-Robson chart).

Findings: Fallers had lower vision stabilization; no significant decrease in visual stabilization between those with fear of falling and those without fear. The risk of falling was 2.1 times greater for a 0.1 decrease in visual stabilization.

Limitations: Small sample size; cross-sectional design.

U.S. Census Bureau. (2008). *An Older and More Diverse Nation by Midcentury.* Retrieved 10/21, 2009, from Release/www/releases/archives/population/ 012496.html

Aim: To inform the public on population projections and how this change affects health care policy and distribution of resources.

Sample: Not a study but projections are based on the trends found in the census.

Source: A press release issued by the Census Bureau.

Ethnicity: Whites, Blacks, Asians, Hispanics, Native Hawaiians and other Pacific Islanders, American Indians, Alaskans.

Findings: It is expected that the the current minority population will become the majority population by the year 2042, comprising 235.7 million people out of 439 million in the total population. The current majority or White race is expected to make up only 46% of the total population by the year 2050, a drop from 66% in 2008. The Hispanic population is expected to triple to 132.8 million by the year 2050; Blacks from 14 to 15% of the population by 2050, and Asians from 5.1% to 9.2% of the population; American Indians and Alaskan natives are projected to increase from 4.9 to 8.6%; Native Hawaiian and Other Pacific Islander from 1.1 to 2.6 million, and people of two or more races will increase from 5.2 to 16.2 million. Health practitioners will need to do more population-based studies to address the impact culture plays in health maintenance behaviors and practices.

Limitations: Readers must take into consideration the original source(s) of data, validation of findings, methods and funding of the original study.

U.S. Census Bureau. (2008). *An older more diverse nation by midcentury.* 2010, from http://www.census.gov/newsroom/releases/archives/population/cb12-243.html.

Aims: To provide education/information on projected ethnic/racial changes in the U.S. population.

Source: U.S. census and surveys based on the 2000 Census.

Sample: N/A.

Ethnicity: All ethnicities.

Measures: N/A.

Findings: Minorities are projected to become the majority by 2042, increasing to 88.5 million by 2050 from 38.7 million in 2008. One out of every 5 Americans will be age >65 by 2030. Those over age 85 will triple from 5.4 million to 19 million between 2008-2050. The non-Hispanic, single-race White population is expected to decrease and make up 46% of the population by 2050, down from 66% in 2008. Blacks will increase in number from 41.1 million or 14% in 2008 to 65.7 million or 15% by 2050. Hispanic population is projected to triple from 46.7 million to 132.8 million between 2008-2050. One out of 3 U.S. residents will be Hispanic. Asians will increase in population from 15.5 million-40 million, an increase from 5.1%-9.2%. The American Indian/Alaskan population is projected to increase from 4.9-8.6 million or from 1.6%-2% of the total population. Native Hawaiians/Pacific Islanders are expected to increase in population from 1.1-2.6 million.

Limitations: The projections are based on the accuracy of data reported to the U.S. census and based on the assumption that trends of birth, death, and migration hold steady and true.

U.S. Census Bureau. (2012). U.S. Census Bureau projection show a slower growing, older, more diverse nation a half a century from now. Retrieved from http://www.census.gov/newsroom/releases/archives/population/cb12-243.html

Aims: To educate the public on the estimated changes in the population of the United States.

Source: A government website publication.

Sample: This is not a study.

Ethnicity: Racial groups addressed include non-Hispanic Whites, Whites alone, non-Hispanics of any race, Blacks alone, Asian, non-Hispanic Pacific Islander, American Indian/Alaska natives, two or more races.

Measures: Data from the U.S. Census.

Findings: The White population was estimated to reach 199.6 million by the year 2024—an increase from 2012, where the White population stood at 197.8 million. The White population is expected to decrease by almost 20.6 million from the years 2024-2060. Hispanics are expected to increase their population from 53.3 million in the year 2012 to 128.8 million in the year 2060. African Americans/Blacks are expected to increase from 41.2 million in 2012 to 61.8 million by the year 2060. Asian Americans are expected to increase their population from 15.9 million to 34.4 million by from the year 2012-2060. By the year 2060, the minority population is expected to increase from 37-57 million people. Among the older population, the population is expected to be primarily non-Hispanic White. Of those ages 65 and older, 56% will be non-Hispanic White, 21.2% will be Hispanic, and 12.5% will be non-Hispanic Black. By the year 2056, it is estimated that the population aged 65 and older will outnumber the population aged 18 and under.

Limitations: N/A.

U.S. Preventive Service Task Force. (2011). Osteoporosis screening. Retrieved from http://www.uspreventiveservicestaskforce.org/Page/Topic/recommendation-summary/osteoporosis-screening

Aims: To inform professional practitioners and the general public about recommendations for osteoporosis screening.

Source: A government website publication. It is evidence-based and derived from a systematic review of the literature.

Sample: This is not a study but it is based on a review of literature on the topic.

Ethnicity: N/A; not specified.

Measures: Dual energy absorptiometry (DXA) of the hip and lumbar spine and ultrasonography of the calcaneus.

Findings: United States Preventive Services Task Force (USPSTF) made Grade 3 recommendations. This service (DXA) is recommended for all women age 65 and over. It should be offered to women younger than the age of 65 if their risk of fractures is greater than or equal to that of a 65-year-old White woman. There is not enough evidence to indicate that men are in need of this assessment.

Limitations: The authors did not specify the methods they used to do the systematic review. They did not specify inclusion or exclusion criteria for the research articles were used to come to their conclusions.

United States Department of Health and Human Services, Health Resources and Services Administration. (2004). *Changing demographics and the implications for physicians, nurses and other health workers.* Retrieved 1/1/2011, 2011, from http://www.hrsa.gov/healthworkforce/reports/changingdemo/aging.html

Aims: To educate/inform and provide additional resource information regarding the expected impact the changing demographic pattern will have on allocation of health care services, particularly as the ethnic population increases in the coming years.

Source: A government website reporting on patterns of change from a synthesis of literature from the Workforce Analysis Branch of the Bureau of Health Professions Health Resources and Services Administration.

Sample: N/A.

Ethnicity: Minorities.

Measures: N/A.

Findings: There will be an increased need for physicians if the current pattern of population growth continues. Aging, increased patient acuity will increase demand for doctors from 2.8/thousand population in 2000 to 3.1/thousand population by 2020. The demand for full time RN staff will increase from 7.0-7.5/thousand population in the same time period. The workforce providing that care is expected to retire at approximately the same time the demand is expected to be at its highest, provoking concerns about attraction of new healthcare workers. Increased expenditures will put stress on the Medicare and Medicaid systems as elderly populations grow by 50% between 2000-2020 and by 127% by 2050. Time spent by physicians administering care to the elderly in the year 2000 was 32% of patient care hours. That is expected to increase to 39% by the year 2020 if current trends continue. It is expected that by this time, 1 out of every 5 Americans will be elderly, with the fastest growing segment of the elderly population being the oldest old (over age 85). Elderly adults' children who are caregivers to elderly parents may be in need of care themselves. Some baby boomers had either no child to provide care to them in their later years; some had few children to provide such unpaid care. Other factors affecting care provided to elderly parents include loss of productivity (jobs) and high divorce rate among baby boomers make it less likely for a parent who is divorced to receive assistance from an adult child than a widowed parent. Minorities have different cultural patterns of health care utilization that may be secondary to accessibility. Thirty-one percent of physician healthcare hours were provided to minorities in 2000; that number is expected to increase to 40% of patient care hours by the year 2020 for minority patients.

Limitations: Did not address the framework for a solution to the problems addressed for the minority population.

Virk, S., & McConville, K. M. (2006). Virtual reality applications in improving postural control and minimizing falls. *Engineering in Medicine and Biology Society, EMBS 28th Annual International Conference of the IEEE, 1*, 2694-2697.

Aims: To examine how the central nervous system (CNS) integrates sensory information obtained from visual, vestibular, proprioceptive, and somatosensory inputs; to examine how elderly differ from young people in terms of balance maintenance; to examine how virtual reality can be used in the rehabilitation setting to help people in physical and occupational therapy.

Source: This is a narrative review of the literature.

Sample: Not a study; focus on examining difference in age primarily two age groups (young adults and elderly adults) with a history of falls or a susceptibility to fall.

Ethnicity: Not specified or addressed.

Measures: Berg Balance scale, functional reach, postural sway (balance board) followed by training utilizing virtual reality.

Findings: The visual, vestibular, proprioceptive, and somatosensory systems send information to the CNS which takes information and coordinates it with the goal of maintaining postural control and upright stance, even when there are sudden changes. This system is altered by old age as elderly have the tendency to make more moves to regain balance, have fewer head movements, rely more on sight, and grab objects to stay upright compared to younger counterparts. Virtual reality can be used in PT/OT (physical therapy/occupational therapy) in persons with fall histories. It is low-cost and provides an environment similar to reality that allows for the study of sensory-neural responses simultaneously and in isolation.

Limitations: None of the downsides of virtual reality are presented; it is always fair and balanced to present both benefits as well as risks/downsides of a potential proposed therapy or intervention.

Volpato, S., Leveille, S. G., Blaum, C., Fried, L. P., & Guralnik, J. M. (2005). Risk factors for falls in older disabled women with diabetes: The women's health and aging study. *The Journals of Gerontology: Series A, Biological Sciences and Medical Sciences*, *60*, 1539-1545.

Aims: To evaluate the relationship between falls and diabetes and fall risk.

Source: A secondary data analysis with a 3-year follow-up.

Sample: N = 1,002; using participants from the Women's Health and Aging Study (WHAS), a random sample of Medicare beneficiaries who are community-dwelling, scoring >18 on Mini-Mental State Exam (MMSE).

Ethnicity: Not specified.

Measures: Diabetes at baseline using an algorithm. Diabetes defined (diagnosed by MD, on oral hypoglycemics or insulin, hgbA1c >10); nondiabetics (no diagnosis from MD, hgbA1c <10, not on medications). Falls (prior year and during 3-year follow-up every 6 months via self-report of number and worst injuries suffered); fall risk factors: body mass index (BMI), peripheral artery disease (ankle-brachial index), large fiber sensory nerve function using Vibratron II); pain (10-point numeric scale); medications (insulin, oral antihyperglycemics, psychotherapeutic agents, anxiolytics, hypotensive agents, analgesics); functional status (self-report on ADLs); performance measures (chair stands, 4-meter walk times, balance test, maximal knee extension with dynamometer).

Findings: Final analysis included 878; greater than 60% fell at least once in the 3-year follow-up with those on insulin at greatest risk ($p < .001$); recurrent falls risk high in those taking insulin (59%) and lower for other diabetics and nondiabetics (30.9% and 27.9%, $p < .001$). Being disabled and having diabetes put women at risk for falls (44% increase) and recurrent falls. Being disabled and on insulin increased risk of recurring falls 3x during follow-up (OR 2.73, 95% CI, 1.61-4.63). Risk of falling was greater if participants experienced pain and had high BMI vs. women without pain and with lower BMI. Factors independently associated with recurrent falls: insulin usage, overweight, lower-extremity pain, poor lower-extremity performance.

Limitations: Population included women with disabilities; no fasting glucose in algorithm, hgbA1c only available for 65% of the sample.

Weber, V., White, A., & McIlvried, R. (2008). An electronic medical record (EMR)-based intervention to reduce polypharmacy and falls in an ambulatory rural elderly population. *Journal of General Internal Medicine, 23*, 399-404.

Aims: To assess the effect an emergency medical record (EMR)-based intervention has on fall reduction, reduction in medications, particularly psychoactive medications.

Source: A prospective, randomized, 15-month study with measures at baseline, month 1, 3, 6, 9, 12, and 15 via self-report.

Sample: N = 620, community-dwelling males and females, age >70 from Geisinger Health System (GHS) serving 40 counties of rural central and northeastern Pennsylvania.

Intervention: Fifteen clinic sites randomized to intervention and 3 sites as controls. Intervention was a review of patients' medical records for medications at inappropriate doses. The provider received a message via EMR advising that patient was at fall risk. Evidence-based guidelines referred based on American Geriatrics Society/American Academy of Orthopedic Surgery. Controls received usual care.

Ethnicity: Not specified.

Measures: Falls (medical encounters using standard definition of falls, not provided); medications (name, start date, description, quantity, refills, dosage); demographics (age, sex, presence of diagnoses).

Findings: Significant effect of intervention on total number of medications started during the study period ($p < .01$), with similar findings for psychoactive medications ($p < .05$). Where participants were on 2 or more psychoactive medications at baseline, the intervention had a significant negative relationship in the number of psychoactive medications started. The percentage of falls reported in the comparison group was 10.4% at month 3, and 14.2, 19.39, 15.72, and 15.44% at months 6, 9, 12, and 15, respectively. For the intervention group, 8.74% at least 1 fall at month 3, with 14.86, 12.54, 14.95, and 14.13% at months 6, 9, 12, and 15, respectively. Of the physicians responding (53% or 36), 94.7% read all or some of the message, 47.4% reviewed the guidelines, and 42.1% changed some of their medical management.

Limitations: Single intervention; sample size; ability to count falls reliant upon diagnoses at time of medical encounter; reports on falls reliant on memory and participant willingness to report falls.

Weinberg, L. E., & Strain, L. A. (1995). Community-dwelling older adults' attributions about falls. *Archives of Physical Medicine and Rehabilitation, 76,* 955-60.

Aims: To examine the relationship between elders' attribution of falls to their own limitations and surroundings and sociodemographic, health-related, locus of control-related, and fall-related variables.

Source: A correlational study using a stratified random sampling design that generated a survey instrument assessing needs of elders, the community, and the existing literature.

Sample: N = 1,406 men and women age >65 living in Manitoba, Canada, and drawn from the Manitoba Health database and comprised of 74.1% women. Fallers n = 162; non-fallers n = 1,244.

Ethnicity: No mention of race in this study.

Measures: The dependent variables were extent participants attributed the fall to their limitations or surroundings. Covariables included age, gender, education, marital status, housing arrangements, living arrangements, self-rated health (predictor variable), restrictions imposed by chronic health problems, activities of daily living (ADLs), generalized locus of control.

Findings: Stepwise regression analyses showed that poorer self-rated health ($p < .001$), dexterity difficulties ($p < .01$), and living in an apartment ($p < .05$) were associated with participants' view that their fall was caused by their own internal limitations. Stepwise regression analyses showed that participants who fell outdoors ($p < .01$) and those with better self-rated health ($p < .01$) attributed their falls to their surroundings.

Limitations: Nonexperimental design; findings may not be applicable to other diverse populations.

Welmerink, D. B., Longstreth, W. T., Lyles, M. F., & Fitzpatrick, A. L. (2010). Cognition and the risk of hospitalization for serious falls in the elderly: Results from the Cardiovascular Health Study. *Journal of Gerontology and Biological Science Medicine*, *65*, 1242-1249.

Aims: To assess if cognitive function, processing or both are associated with serious falls resulting in hospitalization.

Source: A population-based longitudinal study with baseline clinic visit with alternating clinic visits and telephone contacts semi-annually.

Sample: N = 5,356; a random sample of enrollees in the Cardiovascular Health Study (CHS) from 4 U.S. counties.

Ethnicity: Whites N = 4,502; other races not specified.

Measures: Demographics (age, race, education, and marital status); current treatment for arthritis; diagnosis of osteoporosis; visual problems; depressive symptoms (CES-D); activities of daily living and instrumental activities of daily living (ADLs/IADLs); completion time for 5 chair stands; gait speed; current prescription and nonprescription medications; BMI; self-report and chart review/ physician questionnaire verified diagnosis of the following: myocardial infarction, stroke, angina, congestive heart failure, claudication, transient ischemic attack; information on hospitalizations of any kind in between visits (chart/physician verified); Mini-Mental State Examination (MMSE) and DSST at initial clinic visit with subsequent visits, MMSE was replaced with 3MS; serious falls with hospitalization had to meet 3 criteria: injury was the prime cause of hospitalization, presence of an E code for falls (E880-E886, E888), and DSST and #MS scores available at baseline.

Findings: 702 participants had at least 1 fall requiring hospitalization. Hospitalized fallers were older, White, female, had normal BMI, osteoporosis, visual problems, difficulties with one or more ADLs/IADLs, had longer chair stand times and lower DSST scores. Lower scoring increased risk of serious falls by 50%. Risk of a serious fall increased 45% for participants scoring 80-89 on 2MS. Risk of serious fall increased 2.16 times for participants scoring <80.

Limitations: Included were those elderly experiencing the most serious falls; researchers were reliant on the coding to be done correctly; unable to assess all the ways that falls may be associated with cognition; more complex measures of physical function may be more sensitive; adjustment for balance not done; small ethnic sample; no validity/reliability on instrumentation.

Wert, D. M., Talkowski, J. B., Brach, J., & VanSwearingen, J. (2010). Characteristics of walking, activity, fear of falling and falls in community-dwelling older adults by residence. *Journal of Geriatric Physical Therapy (2001), 33*, 41-45.

Aims: To compare community-dwelling elderly living in 2 types of residences (senior living residences or SLRs and individual community residences or ILRs) to see if differences in physical and psychological outcomes can be associated with each residence.

Source: A cross-sectional study using a secondary data analysis from an interventional study.

Sample: N = 59 divided into two groups. The first group, the SLR composed of 18, mean age 83.9 with 83% females. The second group, the ILR composed of 41 seniors from the Senior Mobility Aging and Research Training (SMART) Center at University of Pittsburgh. Mean age of SMART group 77.5, with 61% females. Participants must be age >65, cleared by an MD for low-moderate, supervised activity, be ambulatory, walk with assistive devices except for straight canes, have difficulty with walking/balance/gait/step. Excluded were demented/cognitively impaired, those on oxygen, with uncontrolled heart disease or an acute illness, with hemiparesis or recent hospitalization.

Ethnicity: Primarily Whites. The SLR groups were 100% Whites and the ILR was 87.8% Whites.

Measures: Demographics (age, education, gender, race, living arrangement, comorbidities); gait speed (GaitMat); physical activity (accelerometer attached at the waist and calculated over a week); activity/activity restriction (Survey of Activity and Fear of Falling in the Elderly or SAFFE score); fear of falling (SAFFE fear subscale and yes/no response to “Are you afraid of falling?”); confidence in walking (Gait Efficacy Scale); fall history (number of falls in the past year).

Findings: Elderly in the SLR were older (average 83.9 years vs. 77.5 in ILR); lived alone (15/18 or 83% vs. 16/41 or 39%); fell (6/18 or 33.3% vs 18/41 or 43.9% in ILR); had less fear of falling (22% or 4/18 in SLR vs. 54% or 22/41 in ILR) and had greater disease burden (5.6 comorbidities, with a standard deviation of 1.8 vs. 4.4 comorbidities, with a standard deviation of 1.95 for ILR).

Limitations: Small sample size and study design limit the ability to generalize findings; small sample of ethnic minorities; cognitively and physically impaired, who are the most likely to have a fall and be fearful, were excluded from this study.

Wilcox, S., Bopp, M., Oberrecht, L., Kammermann, S. K., & McElmurray, C. T. (2003). Psychosocial and perceived environmental correlates of physical activity in rural and older African American and white women. *The Journals of Gerontology: Series B, Psychological Sciences and Social Sciences, 58*, P329-37.

Aims: To examine factors affecting participation in PA (Physical Activity) in a population of elderly White and African American women in a rural community focusing on psychological, social and environmental factors influencing PA in White and African American elderly, rural community-dwelling women and using the Social-Cognitive Theory by Albert Bandura.

Source: A correlational study.

Sample: N = 102 women, age >50, residents of rural Fairfield County, SC. Recruited via letter, then phone-screened from congregate meal sites, civic organizations, an African American church, and a county fair.

Ethnicity: African Americans and Whites.

Measures: Participation in PA; Independent variables: sociodemographics (age, race, occupation, education, marital status); physical activity via PASE (Physical Activity Scale for the Elderly); self-efficacy for PA (12-item scale rating confidence from 1 = sure they could not do to 5 = very sure they could do); social support for PA (20-item scale rating support over 3 months); Physical Activity Decisional Balance Scale (16 items, 10 pros and 6 cons rating importance on a 1-6 scale, with 1 = not important and 5 = extremely important); Depression and Stress (Geriatric Depression Scale of 5 items range 0-5, higher = more depressed); Safety rated at day and night (1 = unsafe, 5 = very safe); Open-Ended Questionnaire (barriers to exercise, motivators, risks).

Findings: As age increased, PA decreased, self-efficacy and social support decreased. Barriers to PA were health and role expectations. As depressive symptoms decreased, greater pros than cons were predictors of increases in PA. Social support motivated PA, but discussions with healthcare providers were associated with decreases in PA (cannot determine why for this finding, a topic for further investigation). Perceived safety was a positive predictor of PA, but women with sidewalks had decreased levels of PA (why? topic of further investigation).

Limitations: Nonprobability sampling, so findings cannot be generalized; health status/living arrangements not known, measures used did not account for leisure-time activities that made up PA, measures of physical environment only done by self-report (no examination of crime statistics for the area).

Wilhelm-Leen, E. R., Hall, Y. N., Deboer, I. H., & Chertow, G. M. (2010). Vitamin D deficiency and frailty in older Americans. *Journal of Internal Medicine, 268,* 171-180.

Aims: To examine the association between 25-hydroxyVitamin D deficiency and frailty; to examine if there is an association between such deficiency and race.

Source: A secondary data analysis of a cross-sectional study using data from the Third National Health and Nutrition Evaluation Survey (NHANES III).

Sample: n = 5,048 men and women aged >60 with data on their 25-hydroxyVitamin D; noninstitutionalized U.S. residents with data collected between 1988 and 1994.

Ethnicity: Whites = 3,968; Blacks = 1,080.

Measures: Frailty (low body weight for height, slow walking speed on the 8-foot walk, weakness, exhaustion, low physical activity level); 25-hydroxyVitamin D levels from blood samples (deficiency is <15 ngml-1, insufficiency is 15 < 30 ngml-1); race, socioeconomic status (poverty income ratio <2.0 is low SES, if >2.0 is high SES).

Findings: Mean levels of serum 25-hydroxyVitamin D were lowest among Blacks. Serum 25-hydroxyVitamin D was associated with frailty in both races, but Blacks suffered deficiency and insufficiency, which increased their odds of being frail. Whites and Blacks north of the 40 degree latitude line had higher frailty rates. Blacks north of the 40 degree latitude line had greater frailty rates (10.4% vs. 6.9%) than those living in the South. Whites north of the 40 degree latitude line were frailer than those living in the South (6.2% vs. 4.1%).

Limitations: This was a cross-sectional evaluation and researchers were not able to follow serum 25-hydroxyVitamin D levels over time; those who were home-examined and excluded from the primary analysis were most likely the most frail and have the most comorbidities; those who lived in northern states were sampled in summer months compared to those residents of southern states who were sampled year-round.

Wilkins, C. H., & Goldfeder, J. S. (2004). Osteoporosis screening is unjustifiably low in older African-American women. *Journal of National Medical Association, 96*, 461-467.

Aims: To examine the screening practices for osteoporosis in African American women.

Source: A retrospective chart review.

Sample: N = 252 women age >53, clinic patients seen from February-April 2000.

Ethnicity: African American N = 214; Caucasian N = 35; Other N = 3.

Measures: Peripheral bone mineral density via calcaneal densitometry; risk factors for osteoporosis (family history), medications (anticonvulsants, estrogen, steroids), smoking history, supplements (Vitamin D/calcium).

Findings: Of 252, 11.5% had prior central bone mineral density (BMD) via DEXA; 39% were given counsel on calcium/Vitamin D; 54% recommended hormone replacement; 74% had mammography, a statistically significant difference in rates of osteoporosis screening, especially among African American women. Of the 128 who had bone mineral density testing, 57 or 44.5% had abnormal BMD via calcaneal assessment; 32 or 25% were osteopenic, 25 or 19.5% were osteoporotic. Caucasians had higher rate of abnormal BMD vs. African Americans (53.3% vs. 40.4%); however, this was not statistically significant. Frequency of abnormal BMD increased with age. BMI was correlated with BMD in African Americans ($p < .001$). At 6 months, 57 with abnormal BMD were referred for central bone mineral density. At this time, 9 or 16%, all African American, had central bone densitometry.

Limitations: Small sample size; use of peripheral bone mineral density for screening when DEXA or central BMD is the gold standard for the diagnosis of osteoporosis.

Wilson, M. M., Miller, D. K., Andresen, E. M., Malmstrom, T. K., Miller, J. P., & Wolinsky, F. D. (2005). Fear of falling and related activity restriction among middle-aged African Americans. *The Journals of Gerontology: Series A, Biological Sciences and Medical Sciences, 60*, 355-360.

Aims: To examine the overlap of fear of falling, low falls efficacy, falls and activity restriction secondary to fear of falling (FOF); to compare the functional status of those with fear to those without fear of falling.

Source: An observational, panel study.

Sample: N = 998 from African American Health Study (AAH), a population-based panel from two catchment areas of St Louis, Missouri. One area is a poor, inner-city area, and the other is a Northwestern suburb.

Ethnicity: Self-classified as Black/African American, born between 1936 and 1950, community-dwelling, and having a Standardized Mini-Mental State Exam score (SMMSE) >16.

Measures: FOF (classified in 3 groups: no fear, fear alone, and fear with activity restriction); fall history (falls in past 2 years, falls in past year; injurious falls, which were defined); falls efficacy (FES); demographics (sex, years of formal education, living arrangement); physical diagnosis (self-report of 9 chronic diseases including hypertension, diabetes, cancer, COPD, coronary artery disease, stroke, arthritis, chronic kidney disease, congestive heart failure); self-rated health (1 question from SF-36); visual acuity; hearing; SMMSE; depressive symptoms (CES-D); social support (5 items from MOS); BADL (LSOA-II); IADL(LSOA-II and Lawton and Brody scale); lower-body limitations (6 items of Nagi scale); upper-body limitations (3 items from Nagi scale); hand grip (dynamometer); performance (5 timed chair stands, usual walking speed for 3 or 4 meters, tandem stance with eyes closed and one-legged stand).

Findings: oOf 998 participants, 627 were female, 371 male. Mean age 56.8; 23.7% lived alone, educational level 12.4 years, chronic conditions 2.1; 35.8% fell in the past 2 years, 24% in the past year; 74.2% had no FOF, 25.8% some FOF, 51.2% FOF with activity restrictions. Older men had lower prevalence of FOF and worse FES scores. Inner-city group was more fearful (34.4%) than the suburban group (23.5%). Lacking overlap of measure of low falls efficacy and fear of falling and activity restriction.

Limitations: Findings may be limited to area, age range, ethnicity; one measure of falls efficacy used; young age group no comparison group; generally healthy; no enlightenment on what makes people have FOF.

Winstein, C. J., Rose, D. K., Tan, S. M., Lewthwaite, R., Chui, H. C., & Azen, S. P. (2004). A randomized controlled comparison of upper-extremity rehabilitation strategies in acute stroke: A pilot study of immediate and long-term outcomes. *Archives of Physical Medicine and Rehabilitation*, *85*, 620-628.

Aims: To evaluate the effectiveness of two programs to be used in patients after acute stroke.

Source: A single-blind, randomized, controlled trial with repeated measures (baseline, immediately posttreatment, 6 and 9 months after stroke). Participants randomized to standard care (SC), functional task practice (FT), or strength training (ST).

Sample: N = 64, men and women age 29-76, 2-35 days after experiencing a first-time stroke with a FIM instrument score of 40-80 on admission.

Ethnicity: Not specified and not addressed.

Measures: Fugl-Meyer physical assessment (upper-extremity portion), the Functional Test of the Hemiparetic Upper Extremity (FTHUE), isometric torque at the shoulder, elbow, wrist; grip and pinch force. Secondary outcomes: self-care, mobility (FIM).

Findings: FT/ST groups had better FIM scores ($p = .04$) and isometric torque ($p = .02$) compared to the SC group. Those with less severe impairment per (Orpington Prognostic Scale) OPS score: FR/ST groups improved significantly more than the SC group ($p < .05$). Long-term outlook: significant differences in upper-extremity range of motion (ROM), isometric torque seen in the ST group. Less severely impaired showed significant improvement, with the FT group doing better than the SC and ST groups.

Limitations: Small sample size; evaluator aware of participants' placement into groups; description of the scales used and their validity/reliability not provided; no information on the ethnicity of the participants, particularly in light of Blacks being affected by strokes in high numbers.

Wofford, J. L., Heuser, M. D., Moran, W. P., Schwartz, E., & Mittelmark, M. B. (1994). Community surveillance of falls among the elderly using computerized EMS transport data. *The American Journal of Emergency Medicine*, *12*(4), 433-437.

Overview: Falls most common injury cause in the elderly affecting up to 30% of elderly age >65 and is the major cause of death; a cause of concern as the population ages. Surveillance using E-codes or computerized hospital data at the time of this article not widely available or accepted. Computerized EMS transport data more readily available as information is obtained by first responders.

Methods: Using data from Forsyth County, NC, data were received from two organizations transporting elders (EMS, taking all 911 calls and a private company transporting convalescent, daytime only transports). Data obtained from January 1, 1990-December 31, 1999.

Variables: Independent variables included age group, race, gender, and place of residence; dependent variables included fall and transport rates.

Statistical Analysis: EMS transport rates compared by 3 age groups (65-74, 75-84, 85+), gender and race. Denominator was Forsyth County census. Denominator for nursing home residents: North Carolina Center for Health and Environmental Statistics. SAS and Epi Info used; Chi-square for differences in rates by gender and race; Chi-square test for trends by age group.

Findings: Fall rates were higher for females than males, higher for Whites than African Americans; increased sevenfold for falls in the youngest age group (65-74) than the oldest (85+years). More than four times as many transports for falls were from community-dwelling elders; nursing homes residents were nearly five times that of community-dwellers; most common calls for falls occurred from midnight to 4 a.m. for both home and nursing home residents. Findings that conflicted with previous EMS studies in this county: Whites had higher transport rates for falls than African Americans, and most transports occurred during midnight-4 a.m. The authors stated that this difference in times may be due to the fact that this study presented greater opportunities for people to be transported during daylight hours via private ambulance or personal car.

Limitations: Further validation studies needed, lack of generalization to other EMS systems; may require the use of multiple databases and multiple ambulances; potential for misclassification.

Wolf, L. A., Armour, B. S., & Campbell, V. A. (2008). Racial/ethnic disparities in self-rated health status among adults with and without disabilities-United States 2004-2006. *Morbidity and Mortality Weekly Report*, *57*, 1069.

Aims: To examine self-rated health status of ethnic/racial minorities in the United States.

Source: A cross-sectional telephone survey for the years 2004-2006.

Sample: Community-dwelling, civilian, age >18 from the 50 states, District of Columbia, Puerto Rico, the U.S. Virgin Islands; N = approximately one million.

Ethnicity: Whites, Blacks, Hispanics, Asians, Native Hawaiian or Other Pacific Islander, American Indians and Alaska Natives (AI/AN).

Measures: Using disability definition from Healthy People 2010, people were asked if they had any physical, mental or emotional problems; does that problem require the usage of special equipment? Rate their current health status as excellent, very good, fair or poor.

Findings: Highest disabilities among AI/AN (29%), lowest in Asians (11.6%). Almost 84% Americans had good or better health; however, only 44% of Blacks reported health as very good or excellent, compared to 60% Whites, 59.3% of Asians, 55.8% of Native Hawaiians, and 55.4% of Other Pacific Islanders. Fair or poor health more prevalent in minorities (Blacks 21.1%, Native Hawaiian or Other Pacific Islanders 14.8%, AI/ANs 24.5%) compared to Whites and Asians (12.9% and 10.4%, respectively). Hispanics rate health status almost equally (very good/excellent: 33.6%; good: 35.4%; fair or poor: 31.1%). Disabled were more likely to be in poor health vs. those without disability (40.3% vs. 9.9%; $p < .01$). Blacks without disability reported very good/excellent health; only 49.9% compared to Whites without disability with 66.9%.

Limitations: Cross-sectional design.

Wolf, S. L., Sattin, R. W., Kutner, M., O'Grady, M., Greenspan, A. L., & Gregor, R. J. (2003). Intense tai chi exercise training and fall occurrences in older, transitionally frail adults: A randomized, controlled trial. *Journal of the American Geriatrics Society*, *51*, 1693-1701.

Aims: To compare an intense Tai Chi (TC) program to a wellness education (WE) program in a sample of elderly transitioning to frailty.

Participant Characteristics: N = 311 randomized with 25 dropouts; age 80.8 years; majority female, White, widowed with high school education and higher from 20 congregate living facilities in the greater Atlanta area.

Source: A 48-week, single-blinded, randomized controlled trial (RCT) with 2 groups: a Tai Chi group vs. a Wellness program.

Sample: N = 311 randomized but 286 completed the intervention.

Ethnicity: N = 231 Whites combined; N = 55 non-Whites.

Measures: Demographics (age, sex, ethnicity, education, marital status); falls (defined), circumstances and type of fall, reason, injury and extent (injurious fall defined), type and extent of medical attention via self-report on forms with a follow-up phone call; function (assessed every 4 months); behavior (FES and ABC for fear of falling); HRQOL (SIP); depression (CES-D); cognitive impairment (MMSE); height, weight, muscle strength, self-report of fracture history, changes in medications, health status, exercise.

Findings: Relative risk for falls for study duration for TC vs. WE was 0.75 (95% CI = 0.52-1.08). Forty-six percent of participants had not fallen, 47.6% fell at least once in the TC group and 60.3% in the WE group. Prior fall-related fractures and education modified treatment effect. Those in TC with a history of fracture had significantly lower fall rate vs. the WE group. TC participants without a high school diploma had significantly lower fall rates vs. WE group. TC group with high school diploma or more had similar fall rates as those in the WE group. Those lacking a high school degree were less physically active at baseline. Potential confounder: SIP scores. Those with lower or better scores had lower fall relative risk.

Limitations: Baseline similarity in frailty of groups; power insufficient to detect effect, larger effect in more robust participants. TC group had better functional reach, single limb support, SIP profile, physical dimensions at baseline. Elders were required to be frail but that construct along with the meaning of transitionally frail was poorly defined; test validity/reliability absent.

Wolinsky, F. D., Bentler, S. E., Liu, L., Obrizan, M., Cook, E. A., Wright, K. B., Geweke, J. F., Chrischilles, E. A., Pavlik, C. E., Ohsfeldt, R. L., Jones, M. P., Richardson, K. K., Rosenthal, G. E., & Wallace, R. B. (2009). Recent hospitalization and the risk of hip fracture among older Americans. *Journal of Gerontology and Biological Science Medicine*, *64*(2), 249-255.

Participant Characteristics: N = 5,511, with an average age of 77 years; 38% were male, 10% African American, 4% Hispanic, 41% widowed, with a mean income of $25,417. One fourth went to high school, one fourth had arthritis, 9% had angina, 13% had cancer, 12% diabetes, 46% hypertension, 5% had a prior hip fracture, and 7% had psychological problems. Study design: prospective, longitudinal study of elders (AHEAD).

Variables/Tools: Dependent variables were hip fractures at baseline interview; ICD-9 codes found on death certificate or on enrollment in Medicare-managed care. Independent variables included sociodemographics, health behaviors such as smoking/drinking; disease history (for a comorbidity index); functional status; fall history in the past year; pain; vision, memory, urinary incontinence, cognition (through word recall and TICS); ability to pick up $0.10; depressive symptoms; ADLs/IADLs (self-report); health shocks (postbaseline Medicare claims).

Findings/Limitations: Hip fracture risk increased with older age. African Americans were 63% less likely and Hispanics were 44% less likely than Whites to fracture a hip. More likely to fracture a hip were mobile home inhabitants, underweight, smokers (49% increase in current smokers, former smokers had a 52% increase), diabetics, psychiatric disorder sufferers, self-reporters of poor health, those falling in the year prior to baseline assessment, those with poor or who refused the word recall test and those with low TICS scores.

Limitations: BMD not factored in the analysis; self-report used and no performance tests used; clinical history not obtained; baseline risk factors used from AHEAD.

Wolinsky, F. D., Miller, T. R., Malmstrom, T. K., Miller, J. P., Schootman, M., Andresen, E., & Miller, D. K. (2007). Four-year lower extremity disability trajectories among African American men and women. *Journal of Gerontology and Biological Science Medicine, 62*, 525-530.

Aims: To examine lower extremity trajectories among community-dwelling African Americans.

Source: A repeated measures (baseline, 12, 24, and 48 months), longitudinal, correlational study.

Sample: 998 African American Health project (AAH) study participants. Two strata examined: poorer, inner city and suburban; born between 1936-1950, with a mean age of 56.3 years; males = 37% had a yearly income <420,000, 37% fell in the past year, 31% had fear of falling, 47% had fair to poor health, 48% had arthritis and a mean score on SPPB of 8, with an average BMI of 30.4 and a grip strength of 34 kg. Study design: a secondary data analysis with measures at baseline, 12, 24, 36, and 48 months.

Ethnicity: African Americans.

Measures: Lower extremity disability trajectories with 9 standard questions on ADLs/IADLs, lower-body function or follow-up of questions to respondents reporting difficulties; sociodemographics such as age, sex, marital status, fall history; psychosocial variables such as fear of falling, depression; socioeconomics such as educational level, income, self-rated neighborhood quality; physical performance such as peak flow, grip strength, SPPB score; morbidity indices such as self-report of hearing, vision, overall health, and cognition via MMSE, BMI, report of 8 diseases.

Findings: Largest relative effect sizes ($p < .001$) were for physical performance, fear of falling, poor or fair self-rated health, arthritis, clinically relevant depression symptoms, BMI, aging, asthma. Statistically significant but with modest effect: remaining covariates except for age, neighborhood quality, COPD, kidney disease.

Limitations: Only the reliability/validity of the tool assessing 9 standard questions on ADLs/IADLs were given and the tool did not assess upper-body function. Yearly evaluation was not dynamic and was done for only 4 years vs. a decade. Results may not be generalized to other areas, older age groups of African Americans. There was no direct comparison to Whites or Hispanics.

Wong, C. A., Rectenwald, A. J., Jones, M. L., Waterman, B. M., Bollini, M. L., & Dunagan, M. C. (2011). The cost of serious fall-related injuries at three Midwestern hospitals. *Joint Commission Journal on Quality and Patient Safety*, *37*, 81-87.

Aims: To estimate costs and length of stay (LOS) as a result of serious fall injuries and to assess optimal bipartite matching (OBM) analysis in the assessment.

Source: A retrospective, case-control study.

Sample: N = 57 cases, mean age 68.8 years +/- 12.7, females = 31; controls N = 109, mean age 68.9 years +/- 13.3, females = 63.

Ethnicity: White cases = 47, White controls=83. No other ethnicities/races addressed.

Measures: Data from Barnes Jewish Hospital, Christian Hospital, and Missouri Baptist Medical Center includes operating cost data, previous years; costs (Consumer Price Index for All Urban Consumers), comorbidity burden using the Charlson Comorbidity Index (CCI), length of stay (LOS).

Findings: Multivariate analysis showed fallers with serious injury cost $13,316 more than controls (p < .001, 95%, CI = $1,395-35,561). Fallers stayed 6.3 days longer (p < .001, 95%, CI = 2.4-14.9) and had higher scores on the CCI. Using OBM analysis, fallers cost $13,806 more (p < .001, 95%, CI $5,808-29,450); stayed 6.9 days longer (p < .001. 95%, CI = 2.8-14.9) compared to non-fallers.

Limitations: Costs were based on operational costs and not total costs; factors not included in analysis were readmissions and costs for outpatient services; use of retrospective medical records data that may not have indicated that the patient died secondary to fall injuries.

Woodson, G. C. (2004). Risk factors for osteoporosis in post-menopausal African-American women. *Current Medical Research and Opinion, 20*, 1681-1687.

Aims: To examine/evaluate osteoporosis risk factors in African American females with a diagnosis of osteoporosis with the goal of guiding practitioners in screening and treatment.

Source: A retrospective, case-control study.

Sample: N = 201 postmenopausal females with an initial dual-energy x-ray absorptiometry (DXA) screen done at Osteoporosis Center of Atlanta between 1992-2002.

Ethnicity: African Americans.

Measures: A 17-item, self-administered osteoporosis risk factor questionnaire assessing patient and family medical history, past and present drug use, dietary and activity habits. Categorization of osteoporosis, osteopenia or normal was based on manufacturers' recommendations using World Health Organization (WHO) standards for classification based on T-scores.

Findings: Of 201 participants, 56 were osteoporotic, 99 osteopenic, 46 normal. Risk factors more prevalent among the group with osteoporosis compared to the group without the disease include sedentary lifestyle ($p < .003$), family history of osteoporosis ($p < .003$) a history of bilateral oophorectomy ($p < .03$). Among women with normal bone mineral density (BMD), commonalities include polyarthritis ($p < .001$), consumption of 2 or more soft drinks/daily ($p < .03$), premature menopause ($p < .05$). More common in the normal group was previous use of birth control pills ($p < .005$) and estrogen therapy ($p < .05$); more women with osteoporosis found using alendronate ($p < .4$), and etidronate ($p < .04$) compared with the normal group.

Limitations: Small sample size, no other demographic information other than race provided; potential selection bias since participants were either referred by a physician or self-referred; self-administration of the questionnaire, leaving room for interpretation; questionnaire not validated scientifically.

World Health Organization. (2010). *Falls.* Retrieved 9/25, 2010, from http://www.who.int/mediacentre/factsheets/fs344/en/.

Aims: To provide education/information for the public and the practitioner on falls including risk factors, financial impact from a global perspective.

Source: A government fact sheet.

Sample: Not applicable, this is not a study.

Ethnicity: Not addressed here.

Measures: None.

Findings: Falls are the second greatest cause of accidental death worldwide, with those aged >65 with highest risk of death and injury (20-30% in the U.S. receiving injuries). Another group at risk is children, with both age groups having as a risk factor risk perception. For elderly, inability to perceive risk may be due to cognitive/sensory changes related to old age or unsafe physical environment. Falls are more likely to be deadly among males worldwide. Medications, environment, medical conditions, socioeconomics, cognitive deficits, smoking/substance abuse are other factors contributing to falls.

Limitations: More information geared toward community-based development of prevention programs not given, only an international phone number; email information may not be accessible to those who are elderly and not computer knowledgeable.

Wyman, J. F., Croghan, C. F., Nachreiner, N. M., Gross, C. R., Stock, H. H., Talley, K., & Monigold, M. (2007). Effectiveness of education and individualized counseling in reducing environmental hazards in the homes of community-dwelling older women. *Journal of the American Geriatrics Society, 55*, 1548-1556.

Aims: To evaluate the effectiveness of a program to reduce home hazards in community-dwelling elderly women.

Source: A secondary data analysis from the Fall Evaluation and Prevention Program using a single-blinded, randomized controlled trial with a control group receiving health education and the intervention group receiving a multifactorial fall prevention intervention stratified by age.

Sample: N = 272, females. Fall prevention intervention = 137, control or educational group = 135. Participants: cognitively intact with Mini-Mental State Exam (MMSE) >23, history of unstable posture, >3 medications putting them at risk of falls, had at least 1 fall injury-related risk,

Ethnicity: Whites = 268; Blacks = 4.

Measures: Number of home hazards found (Home Environmental Survey) categorized 6 home hazards: bathroom, lighting, furniture, stairways, storage areas. Intervention group received home visits, phone calls, packets, individual risk assessments, 2 night lights, action plans, reinforcements, and home modifications. The control/educational group received 12 weeks of education on topics of interest but not related to fall prevention.

Findings: Minimum of 4 hazards found in all homes at baseline. Most frequent were low toilet seat (94.7%), no grab bars (87.2%), no night light (85.7%), no bedroom night light (79.4%), bathroom throw rugs (72.4%). Fall intervention: had decreased hazards in bathroom and with lighting ($p < .001$), even removing night lights from final analysis. They had fewer hazards from baseline to follow-up; 69.1% set goal to modify hazards, 55.3% finalized those changes; 8% were resistant to action plans. The control group had fewer bathroom hazards ($p = .03$) but more floor hazards ($p =.02$).

Limitations: Short follow-up; secondary data analysis; very low recruitment of a variety of women so findings cannot be generalized beyond the participants of this study.

Yeh, M. W., Ituarte, P. H., Nishimoto, S., Liu, I. L., Harari, A., Haigh, P. I., & Adams, A. L. (2013). Incidence and prevalence of primary hyperparathyroidism in a racially mixed population. *The Journal of Clinical Endocrinology Metabolism, 98*(3), 1122-1129.

Aims: To assess incidence and prevalence of primary hyper-parathyroidism (PHPT) in a racially diverse population from Southern California.

Source: A descriptive epidemiological study.

Sample: N = 3.5 million Kaiser Permanente enrollees from Southern California including men and women age 20-99 years put into 7 age categories (20-29, 30-39, 40-49, 50-59, 60-79 and >80). Cases were those who were diagnosed with using biochemically.

Ethnicity: Asians (87,873), Blacks (153,991), Hispanics (466,912), Whites (646,383), and Others (405,727) participated in this study.

Measures: Age-adjusted incidence, ratio of parathyroid hormone (PTH) in women to men, annual rates by race and age group, confidence intervals estimated, prevalence using the same denominator as incidence, crude and age-adjusted prevalence rates.

Findings: Age-adjusted incidence of PHPT highest in Blacks (92.0 females, 46.0 males, $p < .0001$), Whites (81 females, 29.4 males). Asians (51.8 females, 27.9 males), Hispanics (48.6 females, 17.1 males), and others (25.4 females, 5.9 males) were lower than Whites ($p < .0001$). Age-adjusted prevalence of PHPT increased from 76.3 to 232.7 per 100,000 in females and from 29.5 to 85.2 per 100,000 in males attributed mostly to classic PHPT. Prevalence of PHPT increased with age. There were 492.2 per 100,000 females 70-79 years of age and 264.1 per 100,000 males aged 80 and over. PHPT most prevalent in elderly Blacks (921.5 per 100,000 females age 70-79) compared to 630.3 per 100,000 elderly White females ($p < .001$). Among Black men over the age of 80, the prevalence was 481.1 per 100,000 compared to 164.7 per 100,000 in comparatively aged Whites ($p < .001$).

Limitations: Patients excluded from the study were those with renal impairment, those with PHPT, those on thiazide diuretics, and those with invasive cancer histories, which according to the researchers would result in underestimation of the incidence and prevalence.

Yogev-Seligmann, G., Hausdorff, J. M., & Giladi, N. (2012, May). Do we always prioritize balance when walking? Towards an integrated model of task prioritization. *Movement Disorders, 27*(6), 765-770. doi: 10.1001/mds.24963.

Aims: To examine the model of task prioritization among elderly.

Source: A narrative review.

Sample: Not a study; N/A.

Ethnicity: Not addressed.

Measures: Main outcomes discussed were hazard estimation, postural reserve, and prioritization strategy. Covariates were self-perception of anxiety levels, executive function, and task expertise.

Findings: Hazard estimation found in the cognitively intact and is the individual assessment or judgement in task prioritization. Postural reserve if intact allows for the focusing on cognitive tasks in times of high postural threat. If postural reserve and hazard estimation are high, such as would be in healthy, young individuals, they would be able to focus and prioritize without effect on gait unless the task were extremely complicated. With decreased postural reserve, processing becomes risky, and if focus is shifted from that cognitive task, postural instability results and a fall is likely.

Limitations: Criteria for acceptance of studies in this review not addressed; methodology of search not addressed.

Zijlstra, G. A., van Haastregt, J. C., Ambergen, T., van Rossum, E., van Eijk, J. T., Tennstedt, S. L., & Kempen, G. I. (2009). Effects of a multi-component cognitive behavioral group intervention on fear of falling and activity avoidance in community-dwelling older adults: results of a randomized controlled trial. *Journal of the American Geriatrics Society, 57*(11), 2020-2028.

Aims: To examine the effect a multicomponent intervention has on fear of falling and activity restriction.

Source: A randomized, control trial with measures at baseline, 2, 8, and 14 months.

Sample: N = 540, with intervention group N = 280 and control/usual care group N = 260.

Ethnicity: Dutch.

Intervention: Cognitive behavioral theory based involving 8 weekly 2-hour sessions with a booster session after the 8th session using videos, lectures, group discussion, and assertiveness training.

Measures: Demographics at baseline (age, sex, living situation, educational level, cognitive status, perceived general health, and fall history in the past 6 months); fear of falling (are you concerned about falling?); activity avoidance (do you avoid certain activities due to concerns about falling?, a 14-item questionnaire on concerns during ADLs); perceived control over falling (4-item scale); daily activity (15-item Frenchay Activities Index); perceived consequences of falling (two 6-item subscales on perceived loss of function and damage to identity); falls data (number of people having any fall anywhere, number of falls, times medical care sought).

Findings: The intervention resulted in decreases in fear of falling, activity avoidance, and concerns about falling and perceived consequences of falling at 2 months. All outcomes decreased at 8 months in the intervention group; fear of falling, perceived control, and perceived identity damage at 14 months. The number of falls and recurrent falls at 14 months decreased in the intervention group compared to the control group.

Limitations: Large number of dropouts, particularly in the intervention group even though they explained how the missing data were dealt with; small to medium effect sizes; no validity/reliability of instruments used.

Appendix B

Letter of Cooperation From Internal Medicine Associates

Mount Sinai

Internal Medicine Associates
Diagnostic and Treatment Center
Mount Sinai Medical Center
17 East 102nd Street, 7th Floor
New York, NY 10029
Phone 212-659-8551
Fax: 212-426-0255

Dr. Kathleen O'Connell
Teachers College
Columbia University
New York, NY

April 21, 2014

Dear Dr. O'Connell:

I am writing to inform you that I have given my permission for Geraldine Basler, RN, MSN to recruit patients from my ambulatory care practice. She has obtained IRB approval (IRB 13-00240) for the study entitled: Factors Associated with the Risk of Falls and Near Falls in Community Dwelling, Elderly Blacks.

Sincerely,

Eva Waite, MD
Medical Director
Internal Medicine Associates.

Appendix C

Consent from Mount Sinai/Teachers College

ICAHN SCHOOL OF MEDICINE AT MOUNT SINAI AND THE MOUNT SINAI HOSPITAL
CONSENT FORM TO VOLUNTEER IN A RESEARCH STUDY
AND AUTHORIZATION FOR USE AND DISCLOSURE OF MEDICAL INFORMATION
Page 1 of 7

IRB Approved

Study ID #: *HSM 13-00240, IF1645086* **Form Version Date:** June 4, 2014

TITLE OF RESEARCH STUDY:

Title: Factors Associated With the Risk of Falls and Near-Falls in Community-Dwelling, Elderly Blacks

PRINCIPAL INVESTIGATOR (HEAD RESEARCHER) NAME AND CONTACT INFORMATION:

Name: Geraldine V. Basler, RN, MSN, CCRN, EdD(c)

Physical Address: Martha Stewart Center for Living, Mt. Sinai Hospital, 1440 Madison Ave, 1st floor, NY, N.Y. 10029;

Mailing Address: Box 1070, Mt. Sinai Medical Center, One Gustave L. Levy Place, New York, N.Y. 10029

Phone: 845-480-2596

WHAT IS A RESEARCH STUDY?

A research study is when scientists try to answer a question about something that we don't know enough about. Participating may not help you or others.

People volunteer to be in a research study. The decision about whether or not to take part is totally up to you. You can also agree to take part now and later change your mind. Whatever you decide is okay. It will not affect your ability to get medical care at Mount Sinai.

Someone will explain this research study to you. Feel free to ask all the questions you want before you decide. Any new information that develops during this research study that might make you change your mind about participating will be given to you promptly.

PURPOSE OF THIS RESEARCH STUDY:

Falls are a common problem for aging people. The reasons that people fall include chronic illness, not being active enough, fears of falling and a sedentary lifestyle. This study is looking at what factors are associated with the risk of falling in older Blacks, and what factors are associated with near falls, or almost falling.

You may qualify to take part in this research study because you classify yourself as Black/African American, you are aged 65 or over, and may or may not have fallen or almost fell in the last year.

Funding for this study has been provided by two grants from Teacher's College of Columbia University.

LENGTH OF TIME AND NUMBER OF PEOPLE EXPECTED TO PARTICIPATE

Your participation in this research study is expected to last about one half hour. This study is only being conducted at the Mount Sinai Medical Center, and 234 people are expected to participate.

DESCRIPTION OF WHAT'S INVOLVED:

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Rev. 3/26/13 IRB Form HRP-502a

TEACHERS COLLEGE, COLUMBIA UNIVERSITY
INSTITUTIONAL REVIEW BOARD
Protocol # 13-338
Consent form approved until 7/30/2015
IRB Signature SH

ICAHN SCHOOL OF MEDICINE AT MOUNT SINAI AND THE MOUNT SINAI HOSPITAL
CONSENT FORM TO VOLUNTEER IN A RESEARCH STUDY
AND AUTHORIZATION FOR USE AND DISCLOSURE OF MEDICAL INFORMATION

IRB Approved

Study ID #: *HSM 13-00240, IF1645086* | **Form Version Date:** June 4, 2014

If you agree to participate in this research study, the following information describes what may be involved.

- You will be asked to read and sign this Informed Consent document, after any questions you have are answered by qualified personnel. You will be given a copy.
- You will be asked to provide answers to 5 questionnaires about your health, your activity level, your health behaviors, and how you feel about your health. We will also ask you to walk 16.4 feet while we observe you walking. The walking will be done in a private area in the clinic.
- We will review your medical chart for the presence of other conditions that might be related to your risk of falling.

YOUR RESPONSIBILITIES IF YOU TAKE PART IN THIS RESEARCH:

If you decide to take part in this research study you will be responsible for the following things: providing answers to all of the survey questions to the best of your ability, participating in the 16.4 foot walk, and giving permission for the review of your medical record.

COSTS OR PAYMENTS THAT MAY RESULT FROM PARTICIPATION:

There is no cost to you for participating in this study. You will be reimbursed $20 for providing answers to the questionnaires, and for doing the 16.4 foot walk. If you are paid by check, it may take some time to be prepared, and you will receive it as soon as it is available.

Checks require some time to be prepared and will be given to you as available. Tax law may require the Mount Sinai Finance Department to report the amount of payment you receive from Mount Sinai to the Internal Revenue Service (IRS) or other agencies, as applicable. Generally this reporting would take place if you receive payments that equal $600 or more from Mount Sinai in a calendar year. You would be responsible for the payment of any tax that may be due.

POSSIBLE BENEFITS:

You are not expected to get any benefit from taking part in this research study. Others may not benefit either. However, a possible benefit to you is that you may become more aware about falls and how to prevent them. It is also possible that the information gained from the study could improve screening for falls in older black patients, and education about falls, and preventing falls..

REASONABLY FORESEEABLE RISKS AND DISCOMFORTS:

The risks of this study are minimal, and are only those associated with walking for 16.4 feet, which might include feeling unsteady or falling, but the study team will be observing you closely to make sure you don't fall.

The questionnaires may contain items that you do not feel comfortable answering. You may choose to skip any questionnaire items that you don't want to answer.

There always exists the potential for loss of private information; however, there are procedures in place to minimize this risk.

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OTHER POSSIBLE OPTIONS TO CONSIDER:

You may decide not to take part in this research study without any penalty. The choice is totally up to you.

IN CASE OF INJURY DURING THIS RESEARCH STUDY:

If you believe that you have suffered an injury related to this research as a participant in this study, you should contact the Principal Investigator: Geraldine Basler at 845-480-2596..

ENDING PARTICIPATION IN THE RESEARCH STUDY:

You may stop taking part in this research study at any time without any penalty. This will not affect your ability to receive medical care at Mount Sinai or to receive any benefits to which you are otherwise entitled.

If you decide to stop being in the research study, please contact the Principal Investigator or the research staff.

You may also withdraw your permission for the use and disclosure of any of your protected information for research, but you must do so in writing to the Principal Investigator at the address on the first page. Even if you withdraw your permission, the Principal Investigator for the research study may still use the information that was already collected if that information is necessary to complete the research study. Your health information may still be used or shared after you withdraw your authorization if you should have an adverse event (a bad effect) from participating in the research study.

Withdrawal without your consent: The study doctor, the sponsor or the institution may stop your involvement in this research study at any time without your consent. This may be because the research study is being stopped, the instructions of the study team have not been followed, the investigator believes it is in your best interest, or for any other reason. If specimens or data have been stored as part of the research study, they too can be destroyed without your consent

CONTACT PERSON(S):

If you have any questions, concerns, or complaints at any time about this research, or you think the research has hurt you, please contact the office of the research team and/or the Principal Investigator at phone number 845-480-2596

This research has been reviewed and approved by an Institutional Review Board. You may reach a representative of the Program for Protection of Human Subjects at the Icahn School of Medicine at Mount Sinai at telephone number (212) 824-8200 during standard work hours for any of the following reasons:

- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You are not comfortable talking to the research team.
- You have questions about your rights as a research subject.
- You want to get information or provide input about this research.

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Study ID #: *HSM 13-00240, IF1645086* **Form Version Date:** June 4, 2014

DISCLOSURE OF FINANCIAL INTERESTS:

None.

MAINTAINING CONFIDENTIALITY – HIPAA AUTHORIZATION:

As you take part in this research project it will be necessary for the research team and others to use and share some of your private protected health information. Consistent with the federal Health Insurance Portability and Accountability Act (HIPAA), we are asking your permission to receive, use and share that information.

What protected health information is collected and used in this study, and might also be disclosed (shared) with others?

As part of this research project, the researchers will collect your name, date of birth, and medical record number. The researchers will also get information from your medical record from the Mount Sinai Medical

During the study the researchers will gather information

- completing the tests, procedures, questionnaires and interviews explained in the description section of this consent.

Why is your protected health information being used?

Your personal contact information is important to be able to contact you during the study. Your health information and the results of any tests and procedures being collected as part of this research study will be used for the purpose of this study as explained earlier in this consent form. The results of this study could be published or presented at scientific meetings, lectures, or other events, but would not include any information that would let others know who you are, unless you give separate permission to do so.

The research team and other authorized members of The Mount Sinai Hospital and Icahn School of Medicine at Mount Sinai (together, "Mount Sinai") workforce may use and share your information to ensure that the research meets legal, institutional or accreditation requirements. For example, the School's Program for the Protection of Human Subjects is responsible for overseeing research on human subjects, and may need to see your information. If you receive any payments for taking part in this study, the Mount Sinai Medical Center Finance Department may need your name, address, social security number, payment amount, and related information for tax reporting purposes. If the research team uncovers abuse, neglect, or reportable diseases, this information may be disclosed to appropriate authorities.

Who, outside Mount Sinai, might receive your protected health information?

As part of the study, the Principal Investigator, study team and others in the Mount Sinai workforce may disclose your protected health information, including the results of the research study tests and procedures, to the following people or organizations: (It is possible that there may be changes to the list during this research study; you may request an up-to-date list at any time by contacting the Principal Investigator.)

- The United States Department of Health and Human Services and the Office of Human Research Protection.

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In all disclosures outside of Mount Sinai, you will not be identified by name, social security number, address, telephone number, or any other direct personal identifier unless disclosure of the direct identifier is required by law. Some records and information disclosed may be identified with a unique code number. The Principal Investigator will ensure that the key to the code will be kept in a locked file, or will be securely stored electronically. The code will not be used to link the information back to you without your permission, unless the law requires it, or rarely if the Institutional Review Board allows it after determining that there would be minimal risk to your privacy. It is possible that a sponsor or their representatives, a data coordinating office, a contract research organization, will come to inspect your records. Even if those records are identifiable when inspected, the information leaving the institution will be stripped of direct identifiers. Additionally, the monitors, auditors, the IRB, the Food and Drug Administration will be granted direct access to your medical records for verification of the research procedures and data. By signing this document you are authorizing this access. We may publish the results of this research. However, we will keep your name and other identifying information confidential.

For how long will Mount Sinai be able to use or disclose your protected health informationYour authorization for use of your protected health information for this specific study does not expire.

Will you be able to access your records?

During your participation in this study, you will have access to your medical record and any study information that is part of that record. The investigator is not required to release to you research information that is not part of your medical record.

Do you need to give us permission to obtain, use or share your health information?

NO! If you decide not to let us obtain, use or share your health information you should not sign this form, and you will not be allowed to volunteer in the research study. If you do not sign, it will not affect your treatment, payment or enrollment in any health plans or affect your eligibility for benefits.

Can you change your mind?

You may withdraw your permission for the use and disclosure of any of your protected information for research, but you must do so in writing to the Principal Investigator at the address on the first page. Even if you withdraw your permission, the Principal Investigator for the research study may still use your protected information that was already collected if that information is necessary to complete the study. Your health information may still be used or shared after you withdraw your authorization if you should have an adverse event (a bad effect) from being in the study. If you withdraw your permission to use your protected health information for research that means you will also be withdrawn from the research study, but standard medical care and any other benefits to which you are entitled will not be affected. You can also tell us you want to withdraw from the research study at any time without canceling the Authorization to use your data.

If you have not already received it, you will also be given The Mount Sinai Hospital Notice of Privacy Practices that contains more information about how Mount Sinai uses and discloses your protected health information.

It is important for you to understand that once information is disclosed to others outside Mount Sinai, the information may be re-disclosed and will no longer be covered by the federal privacy protection regulations. However, even if your information will no longer be protected by federal regulations, where possible, Mount Sinai has entered into agreements with those who will receive your information to continue to protect your confidentiality.

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If as part of this research project your medical records are being reviewed, or a medical history is being taken, it is possible that HIV-related information may be revealed to the researchers. If that is the case, the following information concerns you. If this research does not involve any review of medical records or questions about your medical history or conditions, then the following section may be ignored.

Notice Concerning HIV-Related Information

If you are authorizing the release of HIV-related information, you should be aware that the recipient(s) is (are) prohibited from re-disclosing any HIV-related information without your authorization unless permitted to do so under federal or state law. You also have a right to request a list of people who may receive or use your HIV-related information without authorization. If you experience discrimination because of the release or disclosure of HIV-related information, you may contact the New York State Division of Human Rights at (888) 392-3644 or the New York City Commission on Human Rights at (212) 306-5070. These agencies are responsible for protecting your rights.

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Signature Block for Capable Adult

Your signature below documents your permission to take part in this research and to the use and disclosure of your protected health information. A signed and dated copy will be given to you.

DO NOT SIGN THIS FORM AFTER THIS DATE → **5/22/2015**

Signature of subject — Date

Printed name of subject — Time [required if used for FDA documentation purposes]

Person Explaining Study and Obtaining Consent

Signature of person obtaining consent — Date

Printed name of person obtaining consent — Time [required if used for FDA documentation purposes]

If the individual cannot read, a witness is required to observe the consent process and document below:

My signature below documents that the information in the consent document and any other written information was accurately explained to, and apparently understood by, the subject, and that consent was freely given by the subject.

Signature of witness to consent process — *Date*

Printed name of person witnessing consent process — *Time [required if used for FDA documentation purposes]*

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Teachers College, Columbia University
525 West 120th Street
New York NY 10027
212 678 3000
www.tc.edu

PARTICIPANT'S RIGHTS TEMPLATE

Principal Investigator: Geraldine Basler

Research Title: "Factors Associated with Falls and Near Falls in Community Dwelling Elderly Blacks

- I have read and discussed the Research Description with the researcher. I have had the opportunity to ask questions about the purposes and procedures regarding this study.
- My participation in research is voluntary. I may refuse to participate or withdraw from participation at any time without jeopardy to future medical care, employment, student status or other entitlements.
- The researcher may withdraw me from the research at his/her professional discretion.
- If, during the course of the study, significant new information that has been developed becomes available which may relate to my willingness to continue to participate, the investigator will provide this information to me.
- Any information derived from the research project that personally identifies me will not be voluntarily released or disclosed without my separate consent, except as specifically required by law.
- If at any time I have any questions regarding the research or my participation, I can contact the investigator, who will answer my questions. The investigator's phone number is (__845__) 480-2596_________.
- If at any time I have comments, or concerns regarding the conduct of the research or questions about my rights as a research subject, I should contact the Teachers College, Columbia University Institutional Review Board /IRB. The phone number for the IRB is (212) 678-4105. Or, I can write to the IRB at Teachers College, Columbia University, 525 W. 120th Street, New York, NY, 10027, Box 151.
- I should receive a copy of the Research Description and this Participant's Rights document.
- If video and/or audio taping is part of this research, I ( ) consent to be audio/video taped. I ( ) do NOT consent to being video/audio taped. The written, video and/or audio taped materials will be viewed only by the principal investigator and members of the research team.
- Written, video and/or audio taped materials ( ) may be viewed in an educational setting outside the research

  ( ) may NOT be viewed in an educational setting outside the research.
- My signature means that I agree to participate in this study.

Participant's signature: ____________________________ Date:___/___/___

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Name: ______________________________

If necessary:

Guardian's Signature/consent: __________________________________
Date:____/____/____

Name: ______________________________

Teachers College, Columbia University
525 West 120th Street
New York NY 10027
212 678 3000
www.tc.edu

Assent Form for Minors (8-17 years-old)

I ______________________________ (child's name) agree to participate in the study entitled: ____. The purpose and nature of the study has been fully explained to me by__________________ (investigator's name). I understand what is being asked of me, and should I have any questions, I know that I can contact __________________________ (investigator) at any time. I also understand that I can quit the study any time I want to.

Name of Participant: __________________________________

Signature of Participant: _____________________________________

Witness: _______________________________

Date: ______________________

Investigator's Verification of Explanation

I certify that I have carefully explained the purpose and nature of this research to ___________________________ (participant's name) in age-appropriate language. He/She has had the opportunity to discuss it with me in detail. I have answered all his/her questions and he/she provided the affirmative agreement (i.e. assent) to participate in this research.

Investigator's Signature: _______________________________________

Date: _____________________

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Appendix D

Demographic Assessment

Demographic Assessment

Here are the demographic questions adapted from the 2000 U.S. Census:

Q. Gender
What is your sex?
o Male
o Female

Q. Age
In what year were you born? ____

Q. Marital Status
What is your marital status?
o Now married
o Widowed
o Divorced
o Separated
o Never married

Q. Education
What is the highest degree or level of school you have completed? If currently enrolled, mark the previous grade or highest degree received.
o No schooling completed
o Nursery school to 8th grade
o 9th, 10th or 11th grade
o 12th grade, no diploma
o High school graduate - high school diploma or the equivalent (for example: GED)
o Some college credit, but less than 1 year
o 1 or more years of college, no degree
o Associate degree (for example: AA, AS)
o Bachelor's degree (for example: BA, AB, BS)
o Master's degree (for example: MA, MS, MEng, MEd, MSW, MBA)
o Professional degree (for example: MD, DDS, DVM, LLB, JD)
o Doctorate degree (for example: PhD, EdD)

Q. Employment Status
Are you currently...?
o Employed for wages
o Self-employed
o Out of work and looking for work
o Out of work but not currently looking for work
o A homemaker
o A student
o Retired
o Unable to work

Q. Employer Type
Please describe your work.
o Employee of a for-profit company or business or of an individual, for wages, salary, or commissions
o Employee of a not-for-profit, tax-exempt, or charitable organization
o Local government employee (city, county, etc.)
o State government employee
o Federal government employee
o Self-employed in own not-incorporated business, professional practice, or farm
o Self-employed in own incorporated business, professional practice, or farm
o Working without pay in family business or farm

Q. Housing
Is this house, apartment, or mobile home -
o Owned by you or someone in this household with a mortgage or loan?
o Owned by you or someone in this household free and clear (without a mortgage or loan)?
o Rented for cash rent?
o Occupied without payment of cash rent?

Q. Household Income
What is your total household income?
o Less than $10,000
o $10,000 to $19,999
o $20,000 to $29,999
o $30,000 to $39,999
o $40,000 to $49,999
o $50,000 to $59,999
o $60,000 to $69,999
o $70,000 to $79,999
o $80,000 to $89,999
o $90,000 to $99,999
o $100,000 to $149,999
o $150,000 or more

Q. Ethnicity
Please specify your ethnicity.
o Hispanic or Latino
o Not Hispanic or Latino

Q. Race
Please specify your race.
o American Indian or Alaska Native
o Asian
o Black or African American

o Native Hawaiian or Other Pacific Islander
o White

Appendix E

Rapid Assessment of Physical Activity

How Physically Active Are You?

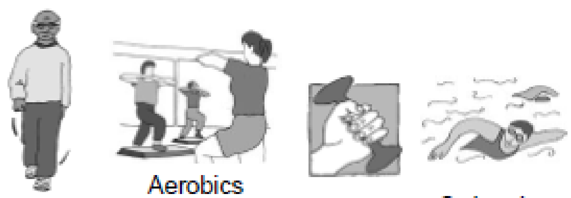
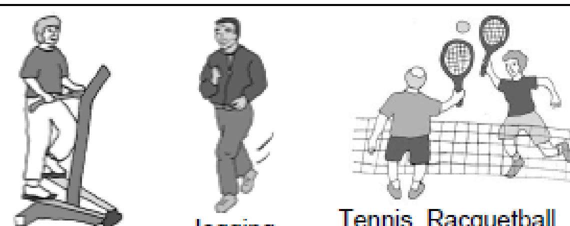
An assessment of level and intensity of physical activity

Rapid Assessment of Physical Activity

Physical Activities are activities where you move and increase your heart rate above its resting rate, whether you do them for pleasure, work, or transportation.

The following questions ask about the amount and intensity of physical activity you usually do. The intensity of the activity is related to the amount of energy you use to do these activities.

Examples of physical activity intensity levels:

Light activities • your heart beats slightly faster than normal • you can talk and sing	 Walking Leisurely · Stretching · Vacuuming or Light Yard Work
Moderate activities • your heart beats faster than normal • you can talk but not sing	 Fast Walking · Aerobics Class · Strength Training · Swimming Gently
Vigorous activities • your heart rate increases a lot • you can't talk or your talking is broken up by large breaths	 Stair Machine · Jogging or Running · Tennis, Racquetball, Pickleball or Badminton

How physically active are you? *(Check one answer on each line)*

			Does this accurately describe you?	
RAPA 1	1	I rarely or never do any physical activities.	Yes ☐	No ☐
	2	I do some **light** or **moderate** physical activities, but not every week.	Yes ☐	No ☐
	3	I do some **light** physical activity every week.	Yes ☐	No ☐
	4	I do **moderate** physical activities every week, but less than 30 minutes a day or 5 days a week.	Yes ☐	No ☐
	5	I do **vigorous** physical activities every week, but less than 20 minutes a day or 3 days a week.	Yes ☐	No ☐
	6	I do 30 minutes or more a day of **moderate** physical activities, 5 or more days a week.	Yes ☐	No ☐
	7	I do 20 minutes or more a day of **vigorous** physical activities, 3 or more days a week.	Yes ☐	No ☐
RAPA 2 (3 = Both 1 & 2)	1	I do activities to increase muscle **strength**, such as lifting weights or calisthenics, once a week or more.	Yes ☐	No ☐
	2	I do activities to improve **flexibility**, such as stretching or yoga, once a week or more.	Yes ☐	No ☐

ID # ______________________________

Today's Date ______________________

Scoring Instructions

RAPA 1: Aerobic

To score, choose the question with the highest score with an affirmative response. Any number less than 6 is suboptimal.

For scoring or summarizing categorically:

Score as sedentary:

1. I rarely or never do any physical activities.

Score as under-active:

2. I do some light or moderate physical activities, but not every week.

Score as under-active regular – light activities:

3. I do some light physical activity every week.

Score as under-active regular:

4. I do moderate physical activities every week, but less than 30 minutes a day or 5 days a week.
5. I do vigorous physical activities every week, but less than 20 minutes a day or 3 days a week.

Score as active:

6. I do 30 minutes or more a day of moderate physical activities, 5 or more days a week.
7. I do 20 minutes or more a day of vigorous physical activities, 3 or more days a week.

RAPA 2: Strength & Flexibility

I do activities to increase muscle strength, such as lifting weights or calisthenics, once a week or more. (1)

I do activities to improve flexibility, such as stretching or yoga, once a week or more. (2)

Both. (3)

None (0)

Appendix F

Stanford Self-Rated Health Assessment

STANFORD
PATIENT EDUCATION
RESEARCH CENTER

Self-Rated Health

In general, would you say your health is: ....*(Circle one)*

Excellent...............................1

Very good 2

Good 3

Fair 4

Poor......................................5

Scoring

Score the number circled. If two consecutive numbers are circled, choose the higher number (worse health); if two non-consecutive numbers are circled, do not score. The score is the value of this single item only. A higher score indicates poorer health.

Characteristics

Tested on 1,129 subjects with chronic disease. N=51 for test-retest.

No. of Items	Observed Range	Mean	Standard Deviation	Internal Consistency Reliability	Test-Retest Reliability
1	1-5	3.29	.91	—	.92

Source of Psychometric Data

Stanford Chronic Disease Self-Management Study. Psychometrics reported in Lorig K, Stewart A, Ritter P, González V, Laurent D, & Lynch J, *Outcome Measures for Health Education and other Health Care Interventions*. Thousand Oaks CA: Sage Publications, 1996, p.25.

Comments

This item is used in the National Health Interview Survey. In a number of studies self-rated health has been found to be an excellent predictor of future health. This scale available in Spanish.

References

Idler EL, & Angel RJ, Self-rated health and mortality in the NHANES-I epidemiologic follow-up study. *American Journal of Public Health*, 80, 1990, pp.446-452.

Schoenfeld DE, Malmrose LC, Blazer DG, Gold DT, & Seeman TE, Self-rated health and mortality in the high-functioning elderly: A closer look at healthy individuals; MacArthur Field Study of Successful Aging. *Journal of Gerontology: Medical Sciences*, 49, 1994, pp.M109-M115.

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Ware JE Jr, Nelson EC, Sherbourne CD, & Stewart AL, Preliminary tests of a 6-item general health survey: A patient application; in AL Stewart & JE Ware Jr (Eds), *Measuring Functioning and Well-Being: The Medical Outcomes Study Approach*, Durham NC: Duke University Press, 1992, pp.291-303.

Wolinsky FD, & Johnson RJ, Perceived health status and mortality among older men and women. *Journal of Gerontology: Social Sciences*, 47, 1992, pp.S304-S312.

Stanford Patient Education Research Center
1000 Welch Road, Suite 204
Palo Alto CA 94304
(650) 723-7935
(650) 725-9422 Fax
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http://patienteducation.stanford.edu

Funded by the National Institute of Nursing Research (NINR)

Appendix G

Modified Falls Efficacy Scale

The Modified Falls Efficacy Scale

Adapted from Tinetti et al, 1990; Hill et al, 1996

On a scale of 0 to 10, how confident are you that you can do each of these activities without falling, with 0 meaning "not confident/not sure at all", 5 being "fairly confident/fairly sure", and 10 being "completely confident/completely sure"?

NOTE:

- If you have stopped doing the activity at least partly because of being afraid of falling, score a 0;
- If you have stopped an activity purely because of a physical problem, leave that item blank (these items are not included in the calculation of the average MFES score).
- If you do not currently do the activity for other reasons, please rate that item based on how you perceive you would rate if you had to do the activity today.

		Not confident at all		Fairly confident		Completely confident
		0 1 2 3 4		5 6 7 8 9		10
1.	Get dressed and undressed	0		5		10
2.	Prepare a simple meal	0		5		10
3.	Take a bath or a shower	0		5		10
4.	Get in/out of a chair	0		5		10
5.	Get in/out of bed	0		5		10
6.	Answer the door or telephone	0		5		10
7.	Walk around the inside of your house	0		5		10
8.	Reach into cabinets or closet	0		5		10
9.	Light housekeeping	0		5		10
10.	Simple shopping	0		5		10
11.	Using public transport	0		5		10
12.	Crossing roads	0		5		10
13.	Light gardening or hanging out the washing*	0		5		10
14.	Using front or rear steps at home	0		5		10

* rate most commonly performed of these activities

Average score/item rated = .../.......

= ....

Appendix H

Elderly Falls Screening Test

Procedure for ELDERLY FALLS SCREENING TEST[1]

Part One: Questionnaire

1. Define fall: We all fall from time to time. A fall would be when you find yourself suddenly on the ground, without intending to get there, after you were in either a lying, sitting or standing position.

Q. How many times in the past year did you fall?
0 or one fall … score 0
2 or more falls … score 1
SCORE:

Q. Did you injure yourself from any fall?
No injury or no fall … score 0
Any injury (soft tissue, fracture) … scores 1 SCORE:

2. Q: How often does it happen to you that you think you are about to fall, but manage to grab something and then don't fall?

Never or rarely have 'near-falls'…score 0
Occasionally or frequently have 'near-falls'…score 1
SCORE:

Part Two: Observations on gait patterns

Respondent is asked to walk at normal pacing speed over a 5 M distance.
1. Walking speed is recorded with a stopwatch
If walking speed is faster than 10 seconds over 5 M … score 0
If walking speed is slower than 10 seconds over 5 M … score 1
SCORE:

2. Gait style is observed and recorded
If gait is even, straight and feet and raised with each step … score 0
If gait is uneven, shuffling, on a wide base or unsteady … score 1
SCORE:
TOTAL SCORE

Appendix I

Charlson Comorbidity Index

Charlson Comorbidity Index

Mary E. Charlson, MD
William T. Foley Distinguished Professor in Medicine
Weill Cornell Medical College
212-746-1684 phone; 212-746-7443; fax
mecharl@med.cornell.edu

Charlson Comorbidity Index
Table of Contents

Patient Version 3

Chart Review Version 7

Patient Version with variable names.. 12

Chart Review Version with variable names.. 16

Scoring.. 21

Charlson Comorbidity Index
Patient version

Components of Classical Charlson Index[1]

1. Have you ever had to be hospitalized for a heart attack?
   ___ No
   ___ Yes

2. Have you ever been hospitalized or treated for heart failure? You may have felt more short of breath, and the doctor may have told you that you have fluid in your lungs, or that your heart was not working efficiently.
   ___ No
   ___ Yes

3. Have you ever had pain or cramping in your calf while walking that causes you to stop or slow down?
   ___ No
   ___ Yes

3a. If yes, have you had a peripheral bypass operation on the arteries in one of your legs to fix the problem?
   ___ No
   ___ Yes

4. Have you ever had a stroke?
   ___ No
   ___ Yes

5. Do you have difficulty moving an arm or leg, or difficulty talking?
   ___ No
   ___ Yes

6. Do you have chronic lung disease, such as asthma, bronchitis, or emphysema, that makes you short of breath or requires ongoing treatment?
   ___ No
   ___ Yes

[1] Charlson, ME, Ales, KA, Pompei, P, MacKenzie, CR. A new method of classification of prognostic comorbidity for longitudinal studies: development and validation. J Chron Disease. 1987; 40(5): 373–383.

7. Do you have diabetes or high blood sugar?
___ No
___ Yes

7a. If yes:
Has your diabetes caused damage to your kidneys?
___ No
___ Yes

Has your diabetes caused problems with your eyes that required treatment by an eye doctor?
___ No
___ Yes

Has your diabetes caused problems with you feet, such as numbness or tingling, or diarrhea at night, or impaired sexual function?
___ No
___ Yes

8. Do you have decreased kidney function?
___ No
___ Yes

8a. If yes, are you on dialysis, or have you had a transplant?
___ No
___ Yes

9. Do you have liver disease, such as hepatitis B or C or cirrhosis?
___ No
___ Yes

9a. If yes, does the liver disease cause abdominal swelling, vomiting blood or other severe problems or have you had a liver transplant?
___ No
___ Yes

10. Do you have any trouble with ulcers in your stomach or small intestine?
___ No
___ Yes

11. Have you had cancer (other than basal cell skin cancer)?
___ No
___ Yes

If yes, which:
___ Lymphoma
___ Leukemia
___ Breast
___ Colon
___ Prostate
___ Lung
___ Melanoma
___ Other ___________________

11a. If yes, has the cancer spread to other locations from its original location?
___ No
___ Yes

12. Do you have Alzheimer's or any other condition that seriously impairs your memory and thinking?
___ No
___ Yes

13. Do you have any rheumatic or connective tissue disease? Such as rheumatoid arthritis, polymyositis, systemic lupus erythematosus, polymyalgia rheumatica, vasculitis, sarcoidosis, Sjogren's syndrome, mixed connective tissue disease or other systemic rheumatic disease?
___ No
___ Yes

14. Do you have HIV or AIDS?
___ No
___ Yes

Additional components of Charlson Comorbidity Index adapted to predict cost[2]

15. Do you need treatment for high blood pressure or hypertension?
___ No
___ Yes

16. Have you had an ulcer or skin breakdown on your legs or back, or repeated episodes of cellulitis on your legs?
___ No
___ Yes

[2] Charlson, ME, Charlson RE, Briggs, W, Hollenberg, J. Can disease management target patients most likely to generate high costs? The impact of comorbidity. J Gen Intern Med. 2007; 22(4): 464-469.

17. Are you being treated for depression or have you been told that you need treatment for depression?
    ___ No
    ___ Yes

18. Do you take coumadin or warfarin?
    ___ No
    ___ Yes

Appendix J

Letter of Cooperation from Martha Stewart Center

MOUNT SINAI SCHOOL OF MEDICINE

Brookdale
Department of Geriatrics
and Palliative Medicine

One Gustave L. Levy Place
Box 1070
New York, NY 10029-6574

Tel.: (212) 241-5561
Fax: (212) 860-9737

January 17, 2013

Re: Geraldine Basler, RN

To Whom It May Concern:

It is my pleasure to write this letter of cooperation for Geraldine Basler's proposed project.

I am an Assistant Professor in Internal Medicine and Geriatrics and Palliative Medicine at Mount Sinai School of Medicine. I am also the Co-director of the Integrated Internal Medicine–Geriatrics Clerkship for third year medical students. My area of research and educational interest has been in fall prevention. I have published research and review articles and give a number of talks on the topic throughout the year.

Gerrie has met with me about her project and I have agreed to serve as mentor and collaborate with her as she moves forward. I will assist her in obtaining IRB approval and recruiting participants. I see patients at the Martha Stewart Center for Living, the ambulatory geriatrics practice at Mount Sinai, and Gerrie will have access to our patients. I look forward to working together.

Sincerely,

Sara Bradley

Sara M. Bradley, MD, FACP
Co-Director, Integrated Internal Medicine-Geriatrics Clerkship
Assistant Professor, Geriatrics & Palliative Medicine, Mount Sinai School of Medicine
One Gustave L. Levy Place, Box 1070
New York, NY 10029

Appendix K

Correlation Matrices

Correlations

		Near falls	AGE	GENDER	EDU-CATION	Assistive Device	SECONDS	Housing Recoded	Income Recoded	SRH Recoded	GAIT	Rapid Assessment of Physical Activity - Aerobic	Rapid Assessment of Physical Activity - Strength & Flexibility
Near falls	Pearson Correlation	1	.005	.175	.050	.217*	.302**	-.001	-.095	-.226*	.264**	-.208*	-.135
	Sig. (2-tailed)		.960	.057	.587	.017	.001	.990	.307	.013	.004	.023	.143
	N	120	120	120	120	120	120	120	117	120	120	120	120
AGE	Pearson Correlation	.005	1	-.040	.047	.349**	.389**	-.146	.011	-.013	.162	-.208*	-.066
	Sig. (2-tailed)	.960		.666	.610	.000	.000	.112	.905	.891	.078	.022	.474
	N	120	120	120	120	120	120	120	117	120	120	120	120
GENDER	Pearson Correlation	.175	-.040	1	-.136	-.110	-.089	-.041	.168	-.016	-.113	.011	-.119
	Sig. (2-tailed)	.057	.666		.140	.233	.333	.660	.071	.861	.218	.909	.194
	N	120	120	120	120	120	120	120	117	120	120	120	120
EDUCATION	Pearson Correlation	.050	.047	-.136	1	-.021	-.004	-.338**	.517**	.089	.010	.088	.087
	Sig. (2-tailed)	.587	.610	.140		.817	.964	.000	.000	.333	.912	.338	.346
	N	120	120	120	120	120	120	120	117	120	120	120	120
Assistive Device	Pearson Correlation	.217*	.349**	-.110	-.021	1	.627**	.023	-.155	-.227*	.643**	-.447**	-.268**
	Sig. (2-tailed)	.017	.000	.233	.817		.000	.805	.095	.013	.000	.000	.003
	N	120	120	120	120	120	120	120	117	120	120	120	120
SECONDS	Pearson Correlation	.302**	.389**	-.089	-.004	.627**	1	.162	-.189*	-.261**	.653**	-.427**	-.209*
	Sig. (2-tailed)	.001	.000	.333	.964	.000		.076	.041	.004	.000	.000	.022
	N	120	120	120	120	120	120	120	117	120	120	120	120
Housing Recoded	Pearson Correlation	-.001	-.146	-.041	-.338**	.023	.162	1	-.505**	-.043	.057	-.055	-.012
	Sig. (2-tailed)	.990	.112	.660	.000	.805	.076		.000	.643	.538	.554	.893
	N	120	120	120	120	120	120	120	117	120	120	120	120
Income Recoded	Pearson Correlation	-.095	.011	.168	.517**	-.155	-.189*	-.505**	1	.215*	-.106	.102	.140
	Sig. (2-tailed)	.307	.905	.071	.000	.095	.041	.000		.020	.256	.273	.132
	N	117	117	117	117	117	117	117	117	117	117	117	117
SRH Recoded	Pearson Correlation	-.226*	-.013	-.016	.089	-.227*	-.261**	-.043	.215*	1	-.57**	.335**	.172
	Sig. (2-tailed)	.013	.891	.861	.333	.013	.004	.643	.020		E.005	.000	.060
	N	120	120	120	120	120	120	120	117	120	120	120	120
GAIT	Pearson Correlation	.264**	.162	-.113	.010	.643**	.653**	.057	-.106	-.257**	1	-.449**	-.294**
	Sig. (2-tailed)	.004	.078	.218	.912	.000	.000	.538	.256	.005		.000	.001
	N	120	120	120	120	120	120	120	117	120	120	120	120
Rapid Assessment of Physical Activity - Aerobic	Pearson Correlation	-.208*	-.208*	.011	.088	-.447**	-.427**	-.055	.102	.335**	-.449**	1	.425**
	Sig. (2-tailed)	.023	.022	.909	.338	.000	.000	.554	.273	.000	.000		.000
	N	120	120	120	120	120	120	120	117	120	120	120	120
Rapid Assessment of Physical Activity - Strength & Flexibility	Pearson Correlation	-.135	-.066	-.119	.087	-.268**	-.209*	-.012	.140	.172	-.294**	.425**	1
	Sig. (2-tailed)	.143	.474	.194	.346	.003	.022	.893	.132	.060	.001	.000	
	N	120	120	120	120	120	120	120	117	120	120	120	120

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations

		FALLS	NEARFALLS	FRS Fall Risk Score	CCI Charlson Comorbidity Index	MFES Modified Falls Efficacy Scale	SRH Recoded	GENDER	EDUCATION	Income Recoded	Housing Recoded	RAPA1 Rapid Assessment of Physical Activity - Aerobic	RAPA2 Rapid Assessment of Physical Activity - Strength & Flexibility	AD Assisted Device
FALLS	Pearson Correlation	1	.282	.661	.100	-.302	-.169	.034	.015	-.049	.054	-.172	-.101	.140
	Sig. (2-tailed)		.002	.000	.275	.001	.065	.714	.868	.597	.559	.061	.276	.129
	N	120	120	120	120	120	120	120	120	117	120	119	118	119
NEARFALLS	Pearson Correlation	.282	1	.623	.088	-.315	-.226	.175	.050	-.095	-.001	-.196	-.110	.210
	Sig. (2-tailed)	.002		.000	.339	.000	.013	.057	.587	.307	.990	.032	.237	.022
	N	120	120	120	120	120	120	120	120	117	120	119	118	119
FRS Fall Risk Score	Pearson Correlation	.661	.623	1	.263	-.557	-.316	-.017	.021	-.151	.123	-.425	-.224	.562
	Sig. (2-tailed)	.000	.000		.004	.000	.000	.854	.823	.104	.181	.000	.015	.000
	N	120	120	120	120	120	120	120	120	117	120	119	118	119
CCI Charlson Comorbidity Index	Pearson Correlation	.100	.088	.263	1	-.245	-.209	.025	.135	.048	.047	-.305	-.213	.302
	Sig. (2-tailed)	.275	.339	.004		.007	.022	.783	.140	.608	.610	.001	.020	.001
	N	120	120	120	120	120	120	120	120	117	120	119	118	119
MFES Modified Falls Efficacy Scale	Pearson Correlation	-.302	-.315	-.557	-.245	1	.391	-.013	.000	.154	-.087	.441	.188	-.489
	Sig. (2-tailed)	.001	.000	.000	.007		.000	.889	.999	.098	.346	.000	.041	.000
	N	120	120	120	120	120	120	120	120	117	120	119	118	119
SRHrecoded SRH Recoded	Pearson Correlation	-.169	-.226	-.316	-.209	.391	1	-.016	.089	.215	-.043	.351	.177	-.225
	Sig. (2-tailed)	.065	.013	.000	.022	.000		.861	.333	.020	.643	.000	.055	.014
	N	120	120	120	120	120	120	120	120	117	120	119	118	119
GENDER	Pearson Correlation	.034	.175	-.017	.025	-.013	-.016	1	-.136	.168	-.041	.017	-.110	-.114
	Sig. (2-tailed)	.714	.057	.854	.783	.889	.861		.140	.071	.660	.852	.237	.217
	N	120	120	120	120	120	120	120	120	117	120	119	118	119
EDUCATION	Pearson Correlation	.015	.050	.021	.135	.000	.089	-.136	1	.517	-.338	.093	.071	-.011
	Sig. (2-tailed)	.868	.587	.823	.140	.999	.333	.140		.000	.000	.312	.445	.901
	N	120	120	120	120	120	120	120	120	117	120	119	118	119
Income_recoded Income Recoded	Pearson Correlation	-.049	-.095	-.151	.048	.154	.215	.168	.517	1	-.505	.115	.148	-.154
	Sig. (2-tailed)	.597	.307	.104	.608	.098	.020	.071	.000		.000	.221	.114	.098
	N	117	117	117	117	117	117	117	117	117	117	116	115	116
housing_recode Housing Recoded	Pearson Correlation	.054	-.001	.123	.047	-.087	-.043	-.041	-.338	-.505	1	-.062	-.025	.027
	Sig. (2-tailed)	.559	.990	.181	.610	.346	.643	.660	.000	.000		.506	.790	.774
	N	120	120	120	120	120	120	120	120	117	120	119	118	119
RAPA1 Rapid Assessment of Physical Activity - Aerobic	Pearson Correlation	-.172	-.196	-.425	-.305	.441	.351	.017	.093	.115	-.062	1	.391	-.432
	Sig. (2-tailed)	.061	.032	.000	.001	.000	.000	.852	.312	.221	.506		.000	.000
	N	119	119	119	119	119	119	119	119	116	119	119	118	118
RAPA2 Rapid Assessment of Physical Activity - Strength & Flexibility	Pearson Correlation	-.101	-.110	-.224	-.213	.188	.177	-.110	.071	.148	-.025	.391	1	-.249
	Sig. (2-tailed)	.276	.237	.015	.020	.041	.055	.237	.445	.114	.790	.000		.007
	N	118	118	118	118	118	118	118	118	115	118	118	118	118
AD Assisted Device	Pearson Correlation	.140	.210	.562	.302	-.489	-.225	-.114	-.011	-.154	.027	-.432	-.249	1
	Sig. (2-tailed)	.129	.022	.000	.001	.000	.014	.217	.901	.098	.774	.000	.007	
	N	119	119	119	119	119	119	119	119	116	119	118	118	119

Appendix L

Letter to Providers

Dear Dr/NP: _______________:

On ___________, your patient, ______________, participated in my research study: HSM 13-00240, entitled *Factors Associated With the Risk of Falls and Near-Falls in Community-Dwelling, Elderly Blacks* (MSSM IRB approved.)

I am writing to inform you of results that may be relevant to your patient's clinical status.
The study involves the following measures which evaluate risk of falls:

Scale	**What is Measured**	**How Scored**
Modified Falls Efficacy Scale:	14 questions assessing a person's confidence of performing ADL without falling: how confident participants feel doing certain activities of daily living without falling.	scored 0-10 scale. 0= no confidence, 5= fairly confident, 10= completely confident.
Elderly Falls Screening Test	Self report of falls, near falls and injuries in past year, plus an observation of gait speed and style	Scored on a scale 0-5 with higher scores indicating increased risk. Scores of 3 and above indicate increased risk of falling
Self Rated Health	Assesses how the person views their own health status	scale of 1-5 (1= excellent 5=Poor)
Rapid Assessment of Physical Activity (RAPA)	9 questions which address the persons activity level (sedentary, active), strength and flexibility	Part 1: question with the highest yes score is chosen. A response less than 6 is suboptimal. Part 2: strengthening activities (1), flexibility activities (2), both (3), none (0)
Charlson Comorbidity Index	18 item inventory of comorbid conditions	Chart review, higher score= more conditions

Your patient _______________________ had the following results which we would like to make you aware of:

Test	Score
Modified Falls Efficacy Scale	
Elderly Falls Screening Test	

Please do not hesitate to contact us for any additional information at______845-480-2596.

Sincerely,
Geraldine V. Basler, RN, MSN, EdD (c), CCRN.