

Women and Heart Disease: Knowledge Differences between Primary Care and Specialty

Practices

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Acknowledgements

Sincere appreciation and gratitude to my Doctor of Nursing Practice Scholarly Project Committee for their guidance, expertise, and time.

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Utmost gratitude to family, friends, and colleagues for their support on this amazing journey.

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## Abstract

**Problem Statement:** Cardiovascular disease (CVD) is the leading cause of death in the United States for women and the second leading cause of death in Pitt County North Carolina. Evidence in the literature supports diminished awareness of heart disease among women and limited data as to provider knowledge of the current guidelines for the prevention of CVD in women.

**Purpose:** This Doctor of Nursing (DNP) project examined the differences in knowledge, barriers, and practice of the 2011 Guidelines for the Prevention of CVD in Women by administering a survey to healthcare providers (HCPs) in primary care and selected specialty practices at a rural Southeastern US university clinic setting.

**Questions:** (1) Is there a difference in knowledge of women and heart disease between primary care, cardiology, and OB/GYN practices? (2) What are the barriers affecting the provision of CVD risk therapies in women? (3) Is there a difference in the practice of women and heart disease between primary care, cardiology, and OB/GYN practices?

**Methods:** Self-administered web-based anonymous questionnaire with a convenience sample of 147 Advanced Practice Registered Nurses, Physician Assistants, and Physicians in specialty and primary care settings.

**Analysis:** Descriptive statistical analysis calculated by Statistical Package for the Social Sciences® (SPSS) using frequencies and percentages, and cross-tabulation to compare variables with practice site and HCP type. Waist circumference measurement and depression screening was performed less than half the time.

**Significance:** Education of HCPs on the current guidelines and implementation into electronic health record.

*Keywords:* Women, cardiovascular disease, healthcare provider, knowledge, awareness

Women and Heart Disease: Are There Knowledge Differences between Primary Care and  
Specialty Practices

**Chapter I: Introduction**

Coronary heart disease (CHD) is the leading cause of death for women in the United States (US). The American Heart Association (AHA) reports that 400,332 females died from CVD in 2010 and exceeds deaths in males by representing 51% of total deaths (Go et al., 2014b). The second leading cause of death for both men and women in Pitt County is heart disease (North Carolina State Center for Health Statistics, 2013a). Despite an increase in awareness of heart disease in women in the past 15 years, knowledge of CHD/CVD remains unacceptable. The barriers to women's lack of awareness of heart disease include lack of knowledge, lack of personal perceived susceptibility or risk for heart disease, and lack of health promoting behaviors (Mosca et al., 2013). There is a paucity of patient education and health promotion, lack of patient and provider awareness and adherence to recommended guidelines in women. Mosca et al. (2005) found that less than one in five physicians surveyed believed that more women than men die of CVD every year. In order to improve the knowledge of heart disease in women and with subsequent adoption of heart healthy promotion behaviors, the clinician needs to increase their awareness, knowledge, and adherence to the current guidelines for the prevention of CVD in women.

**Problem Statement**

There is a perceived lack of cardiovascular lifestyle intervention counseling, implementation of risk-reduction interventions, and preventive pharmacotherapy interventions for women. A review of the literature supports decreased awareness of heart disease in women (Mosca et al., 1999; Mosca et al., 2005; Mosca et al., 2011; Mosca, Barrett-Connor, & Wenger,

2011; Mosca et al., 2013). The AHA administered national surveys every three years since 1997 to evaluate the awareness and knowledge of heart disease risk among women. In the 1997 study, only one in three women were able to identify CVD as the number one cause of death in women (Mosca et al., 2013). Secondary to this finding, a national campaign was conducted to increase the awareness and risk of heart disease to the public and professional groups. Since the initial survey and campaign, the awareness of CVD as the leading cause of death in women has nearly doubled from a low of 30% in the year 1997 to 56% of the women surveyed in 2012 (Mosca et al., 2013).

No published literature is found concerning the awareness or implementation of the CVD guidelines for women among advanced practice registered nurses (APRNs), including nurse practitioners (NPs), certified nurse midwives (CNMs), or physician assistants (PAs). There are studies in the literature, which assessed physician awareness of the AHA guidelines for women; however, there is a gap in the literature of studies evaluating the current knowledge of varied healthcare providers in various clinical settings, including primary care and specialty clinics.

### **Purpose and Objectives**

The purpose of this Doctor of Nursing (DNP) project was to examine the differences in knowledge, attitude, and practice among healthcare providers in primary care and selected specialty practices within a Southeastern rural US university medical school. Designated sites included Family Practice, Internal Medicine, Cardiology, and Obstetrics/Gynecology. A provider survey was administered to APRNs (NPs and CNMs), PAs, and physicians in specialty and primary care settings constructed on the latest 2011 American Heart Association (AHA) guidelines for the prevention of cardiovascular disease in women (Mosca et al., 2011).

**Objective 1: Provider Knowledge**

An anonymous online survey based on the 2011 Guidelines for the Prevention of Cardiovascular Disease in Women (Mosca et al., 2011) assessed the provider's knowledge of awareness of women and heart disease. Findings suggest that education is needed for healthcare providers to improve the assessment of CVD risk in women.

**Objective 2: Provider barriers**

Barriers that were identified in earlier studies (Mosca et al., 2005) include insufficient time to spend with patients, lack of reimbursement, multiple guidelines and sometimes conflicting recommendations, disbelief that more women than men die each year from heart disease, and the patient herself who is not adherent to lifestyle modifications. Oliver-McNeil and Artinian (2002) found that women in their study had a reduced understanding of their personal risk for CVD, therefore were not capable in participating in their risk reducing behaviors. Survey questions in this DNP project included a list of barriers identified in the physician survey utilized by Mosca et al. (2005) and any discordance between provider knowledge of CVD risk factors for women and recommendations for CVD prevention. They included statements about time limitations during clinic visits, lack of insurance coverage for lifestyle interventions, increased likelihood to adopt practice guidelines if published in their own specialty, and inadequate training for interacting with women concerning CVD preventative strategies. The survey questions in this DNP project were predicated on the fact that there was minimal acknowledgement of heart disease claiming more lives in women than men.

**Objective 3: Provider Type and Clinic Setting Differences**

Survey findings varied among providers caring for women. The National Study of Physician Awareness and Adherence to Cardiovascular Disease Prevention Guidelines identified

the OB/GYNs as the physician specialty with the least awareness and adherence to the CVD Guidelines for Women (Mosca et al., 2005). A qualitative study was conducted among OB/GYN physicians and residents to understand and improve the role of the OB/GYN in CVD risk screening and prevention (Ehrenthal et al., 2011). These physicians often provide primary care to women, especially younger pre-menopausal women in their reproductive years; therefore, it is salient to provide these providers with CVD education, guidelines, and prevention in women. Physician focus groups identified five major themes regarding their barriers to cardiovascular screening: professional identity, knowledge and skills, potential for liability, office and practice structure, and practice community and support for collaborative care. In addition to further training, utilization of electronic health records, and collaboration with primary care providers were identified as approaches (Ehrenthal et al., 2011).

### **Background of Problem of Interest**

Women with heart disease present differently than men when they present to clinics or hospital emergency departments, which makes the diagnosis of coronary artery disease a challenge for healthcare providers. Since heart disease is the number one cause of death in women, more gender-specific information should be available. The differences are described in four parts: structural differences, biological/hormonal differences, differences in disease progression, and differences in response to therapy and outcomes (Campbell, 2014). Structurally, women's hearts are smaller and heart vessels are smaller secondary to estrogen. Plaque is more likely to develop in small arteries that become unstable leading to plaque rupture (Campbell, 2014). Biologically, higher levels of estrogen and progesterone, lower levels of testosterone are seen in pre-menopausal women. Estrogen and progesterone promote smaller blood vessels; and estrogen is cardio-protective until menopause (Campbell, 2014). Coronary artery disease

progression in women is different as plaque is softer and more disposed to rupture leading to a myocardial infarction (Campbell, 2014). Women tend to have less high-grade coronary disease stenosis and more widespread CHD; therefore, they are less likely to receive evidence-based preventative care. Another outcome is multiple hospitalizations, office visits, and testing for unexplained chest pain, which reveals non-obstructive CHD in women (Stock & Redberg, 2012).

### **Significance of Problem Related to Healthcare**

One of the goals in the Healthy People 2020 document is to “improve cardiovascular health and quality of life through prevention, detection, and treatment of risk factors for heart attack and stroke; and prevention of repeat cardiovascular events” (U.S. Department of Health and Human Services, 2014, goal section, para. 1). (Services,U.S.Department of Health and Human, 2013; U.S. Department of Health and Human Services, 2014)(Services,U.S.Department of Health and Human, 2013; U.S. Department of Health and Human Services, 2014)One specific objective is a developmental increase of overall cardiovascular health in the US population. There is no data or target related specifically to this objective; however, there is specific data and targets available to similar goals. One objective is to reduce CHD deaths for both men and women to 103.4 per 100,000 population by the year 2020 from 129.2 deaths per 100,000 population in 2007. The latest data from 2012 reveals there was a decrease in CHD deaths to 105.4 per 100, 000 population (U.S. Department of Health and Human Services, 2014). Looking at the disparities between men and women, age-adjusted per 100,000 population, there were 165.1 CHD deaths for men as compared to 96.3 CHD deaths for women in 2008, which was statistically significant. A reduction in CHD deaths was seen in 2012, with 141.1 CHD deaths per 100,000 for men as compared to 77.8 CHD deaths for women, also statistically significant (U.S. Department of Health and Human Services, 2014). Another disparity was race and

ethnicity. Both African-American men and women had the highest deaths from CHD at 149.4 per 100,000 as compared to Asian or Pacific Islander men and women who had the lowest CHD deaths at 75.9 per 100,000 population in 2008, also statistically significant. In 2012, CHD deaths were reduced to 123.4 per 100,000 population in the African-American group as compared to 60.5 CHD deaths per 100,000 in the Asian or Pacific Islander group (U.S. Department of Health and Human Services, 2014).

North Carolina had 99.5 CHD deaths per 100,000 for both men and women in 2013, as compared to 123 CHD deaths per 100,000 in 2007. Pitt County had 91.8 deaths per 100,000 from coronary heart disease for both men and women in 2013 as compared to surrounding rural communities as high as 286.9 per 100,000 in Martin County (U. S. Department of Health and Human Services, 2014). The American Heart Association's 2020 strategic goal is to "improve the cardiovascular health of all Americans by 20% while reducing deaths from cardiovascular diseases and stroke by 20%" (Shay, Gooding, Murillo, & Foraker, 2015, p. 41). Their goal of improving cardiovascular health is to implement strategies to identify and alleviate gaps in the management of women with heart disease.

Healthy People 2020 includes other objectives related to heart disease and stroke that will be briefly presented. They include reducing deaths from stroke, reducing the proportion of persons with hypertension, increasing the proportion of people treated with elevated LDL cholesterol, increasing aspirin use if recommended, and increasing the proportion of adults over the age of 20 or older who are aware of the symptoms of and know how to respond to a heart attack or stroke (U.S. Department of Health and Human Services, 2014).

The Million Hearts® Initiative is co-directed by the Center for Medicare and Medicaid Services (CMS) and Centers for Disease Control and Prevention (CDC). This proposal is to

prevent one million heart attacks and strokes by 2017. Their strategies include improving access to appropriate care, improving the quality of care, concentrated attention on prevention, and motivating the public to lead a heart healthy lifestyle. Quality of care indicators include aspirin for those at risk for heart attack and stroke, blood pressure control, cholesterol management, and smoking cessation (Centers for Medicare and Medicaid Services, 2015).

## Chapter II: Research Based Evidence

### Literature Review

A literature review was conducted and remains on-going, utilizing Medline, Cumulative Index of Nursing and Allied Health (CINAHL), PubMed, Psychological Information Database (PsycINFO), Google Scholar, and Proquest databases. A search was performed between the years 1993 to 2015 with 68 journal articles reviewed. The keywords included women, cardiovascular disease, risk perception, health knowledge, healthcare provider, and awareness. Similar themes identified are the knowledge or lack of awareness of heart disease in women, lack of personal perceived susceptibility or risk for heart disease, and the lack of health promoting behaviors by women.

Coronary heart disease (CHD) is the leading cause of death for women in the United States (US). The American Heart Association (AHA) reports that 400,332 females died from cardiovascular disease (CVD) in 2010 and this death rate exceeds deaths in males by representing 51% of total deaths (Go et al., 2014b). The second leading cause of death for both men and women in Pitt County is heart disease (North Carolina State Center for Health Statistics, 2013b). Despite an increased awareness of heart disease in women in the past 15 years, knowledge of CHD/CVD in women remain unacceptable. The barriers to women's lack of awareness of heart disease include lack of knowledge, lack of personal perceived susceptibility or risk for heart disease, and lack of health promoting behaviors (Mosca et al., 2013). There is a paucity of patient education and health promotion, lack of both patient and provider awareness and adherence to recommended guidelines in women. As an example, less than one in five

physicians surveyed believed that more women than men die of CVD every year (Mosca et al., 2005).

A review of the literature supports women's decreased awareness of heart disease in women (Mosca et al., 1999; Mosca et al., 2005; Mosca et al., 2011; Mosca et al., 2013). In 1997, women listed cancer as the leading cause of death in women and only 30% identified that CHD as the leading cause of death. This response reversed in 2012 with 56% of women surveyed responding that CHD was the leading cause of death in women. However, it was not significantly different from the previous study done in 2009 where 54% stated that heart disease was the leading cause of death. Less than half of the women deemed themselves knowledgeable about heart disease (Mosca et al., 2013). In a similar study, a small sample of 33 women in the Midwestern US could not recognize their individual cardiovascular risk factors and reported moderate levels of most risk reducing behaviors when assessed. As an example, smoking was not perceived as a risk factor in the women that smoked or had a history of smoking (Oliver-Mcneil & Artinian, 2002). Results of a study of 30 women divided equally by race (white, black, and Hispanic) perceived heart disease as a man's disease, however most women thought they were at risk for CHD secondary to family history, obesity, and dietary habits (Arslanian-Engoren, 2007). A majority of women from a rural clinic in Alabama could only state one or two CVD risk factors, citing smoking and obesity as the most common risk factors. These women were at considerable risk for CVD as the average number of risk factors for the participants was three out of ten different risk factors (Hamner & Wilder, 2008).

Globally, CHD is a major cause of death for women. A study of immigrant Turkish, Iranian, and Persian women living in Australia found a low level of awareness of CHD and only 23% responded that CHD was the major cause of death of women (Gholizadeh, Salamonson,

Worrall-Carter, DiGiacomo, & Davidson, 2009). A telephone survey conducted in 2012 found that 18% of women had knowledge of the warning signs of a MI and awareness of atypical symptoms of nausea and shortness of breath in women, which was statistically significant. Chest pain was reported less frequently as a warning sign, however pain that spread to the shoulders, neck, or arm as a warning sign of a heart attack was reported by women (Mosca et al., 2013). In 2009, 53% of women stated they knew to call 9-1-1 if they thought they were having a heart attack as compared to 65% in the investigation in 2012 (Mosca et al., 2013).

The risk factors for CHD include tobacco use (smoking and passive exposure), hypertension, hyperlipidemia, diabetes, metabolic syndrome, obesity, poor diet, physical inactivity, family history of CVD, evidence of advanced subclinical atherosclerosis (coronary calcification, carotid plaque, or thickened intima-medial thickness), poor exercise capacity on treadmill test and/or abnormal heart rate recovery after stopping exercise, systemic autoimmune collagen-vascular disease, and history of preeclampsia, gestational diabetes, or pregnancy-induced hypertension (Mosca et al., 2011; Oliver-Mcneil & Artinian, 2002). According to the 2013 Statistical Update, the rate for smoking for white, black, and Hispanic females is 19.2%, 14.2%, and 7.5% respectively (Go et al., 2014a). Men and women have similar rates of hypertension between ages 45 to 64, with women having a higher rate after the age of 65 (Go et al., 2014c). The risk factor of hyperlipidemia is inadequately managed with 44.9% of women having a cholesterol level over 200 mg/dL and 14.7% with cholesterol levels over 240 mg/dL. Thirty percent of women have low-density lipoprotein (LDL) levels over 130 mg/dL, and 12.3% of women have a high-density lipoprotein (HDL) level less than 40 mg/dL (Go et al., 2014c). Diabetes mellitus is another risk factor and has an estimated incidence in women of 10.1 million while an estimated 33.6 million women have pre-diabetes (Go et al., 2014c). Specific to physical

inactivity and obesity, only 17.1% of women met the 2008 Federal Physical Activity Guidelines for exercise in 2012. For women age 20 or older, 63.7% were overweight or obese with higher rates for non-Hispanic blacks and Mexican Americans. The total obesity rate for women is 35.6%; for non-Hispanic white females 32.5%, non-Hispanic blacks 53.9%, and Mexican-Americans 44.8% (Go et al., 2014c).

Obesity is recognized as a preventable CVD risk; however, BMI calculation cannot completely define the associated risks of obesity. Therefore, waist circumference and waist-hip-ratio are recommended as a more accurate anthropometric measure of abdominal obesity (Lee et al., 2015). A study was conducted in South Korea with pre-menopausal and post-menopausal women to compare the predictive benefit of measuring BMI, waist circumference, and waist-hip-ratio in predicting subclinical atherosclerosis. This was measured by carotid intima media thickness and brachial ankle pulse wave velocity. As a result of estrogen deficiency in menopause, adipose dispersion transfers from the gluteofemoral subcutaneous adipose tissue to abdominal visceral tissue (Lee et al., 2015). Waist-hip-ratio greater than 0.80 correlated with abnormal brachial ankle pulse wave velocity and increased carotid intima media thickness (defined greater than 0.9 mm) as indicators for subclinical atherosclerosis in postmenopausal women, whereas BMI displayed no significant association with brachial ankle pulse velocity or carotid intima media thickness (Lee et al., 2015). In addition, waist-hip-ratio measurement was superior to waist circumference in detecting increased carotid intima media thickness as an indicator for subclinical atherosclerosis in postmenopausal women. In contrast; BMI, waist circumference, and waist-hip-ratio were positively associated with brachial ankle pulse wave velocity and carotid intima media thickness values in premenopausal women (Lee et al., 2015).

A study done with women veterans at a Southeastern Veterans' Affairs Medical Center found that women with 1 to 3 cardiac risk factors and some considered high risk were not worried about coronary artery disease (CAD). Only women with four or more risk factors were more than 50% concerned. In fact, 84% of respondents believed that women had a low lifetime risk of CAD (Biswas, Calhoun, Bosworth, & Bastian, 2002). As noted in the 2013 American Heart Association (AHA) Statistical Update, there is a disparity of awareness of heart disease among Hispanic and black women as compared to white women. A descriptive study done on older (age > 60 years) black and white females recruited from a church community; found that both groups underestimated their CHD risks and reported their risk as no different from other women with a smaller risk perception among black women (Lefler, 2009).

Moore, Kimble, & Minick (2010) described three main themes in a qualitative study interviewing seven women with a known diagnosis of CHD. Comments included "out of sight, out of mind," "why doesn't he talk to me like that?" and "it's scary." Their wish to return to a normal life rather than coping with the chronic nature of their disease and their belief that physicians treated them differently because they were women was conveyed in the interviews. Women with stable, heart disease did not comprehend or recognize the importance of continued risk reduction for future cardiac events. Fear of the unknown was experienced by all the women interviewed, especially after cardiac procedures (Moore, Kimble, & Minick, 2010). More women than men have angina pectoris, 4.1 million versus 3.7 million despite claims that women were asymptomatic (Go et al., 2014c). Women and heart disease is a global concern, as it is the number one cause of death. In a study of rural Australian women, there was a reported adequate knowledge of CHD and more than half of the women were able to report two or more CHD risk

factors; however, they were unaware of their own susceptibility to heart disease and subsequent CV risk reduction behavior (Crouch & Wilson, 2011).

During Go Red for Women events in Minnesota, surveys were collected in 2007, 2008, 2010, and 2011. In their latest survey, 99.3% of the women were able to answer correctly that CVD was the leading cause of death of women in the US. However, less than half of the women (47%) perceived themselves at risk for CVD, even though 67% were considered “at risk” and 12% considered at “high risk” according to the AHA guidelines. The low perception of personal risk did not translate to the high degree of awareness of CVD as the leading cause of death in women (Kling et al., 2013).

A woman’s likelihood of pursuing recommended preventive behaviors will depend on her perceived barriers. Studies have suggested that while women may have increased awareness and knowledge of CHD, many do not participate in risk reducing activities. Examples include exercise, smoking cessation, dietary changes, and stress reduction (Moore et al., 2010). The first preventive guidelines specific for women were written in 1999 and published by the AHA with updates in 2004, 2007, and most recently 2011 (Mosca et al., 2011). Large randomized controlled clinical trials have changed the approach to women’s cardiovascular care. Research involving male participants are not transferrable to women. The latest AHA 2011 Guidelines for Women are a major change in the progression from the evidence-based guidelines in 2007 to the current effectiveness of preventive measures, which is based on the benefits, and risks in clinical practice versus clinical research benefits alone. Risk stratification of all women should be performed following the 2007 AHA guideline algorithm. This algorithm stratifies women to be placed in one of three categories: at high risk, high risk, or optimal risk (Mosca et al., 2011). An evaluation of all women for CVD risk includes a medical, family, and pregnancy history;

symptoms of CVD; depression screening; physical examination including blood pressure, body mass index, and waist circumference; fasting lipoproteins and glucose; and Framingham risk assessment if no personal history of CVD or diabetes is reported (Mosca et al., 2011).

Depression is more common in women and contribute to CVD risk. Depression is common in CHD patients, but there is a lack of agreement on the optimal screening tool. The Patient Health Questionnaire (PHQ) is widely used for depression screening in the CHD population (Ren, Yang, Browning, Thomas, & Liu, 2015). The PHQ-4 is a short self-report questionnaire that includes two questions on depression and two questions on anxiety (Löwe et al., 2010).

In addition to primary care and cardiology clinics, women seen by their obstetricians or gynecologists (OB/GYNs) for their annual visits should be evaluated for cardiovascular risk. Women seen in OB/GYN practices are at high risk for developing CVD, especially those with polycystic ovarian disease (McSweeney, Pettey, Souder, & Rhoads, 2011).

Potential barriers to preventive care includes costs, lack of insurance, language, culture, ethnicity, literacy, disability, frailty, socioeconomic status, work status, family obligations, costs, and access to health care practices. “Culturally sensitive care includes the adaptation of healthcare delivery to meet the needs of a diverse patient population” (Mosca et al., 2011, p. 1410). Another barrier to preventive care may be the health care provider. Time was seen as a limiting factor when internists and OB/GYNs were surveyed. In addition, the lack of knowledge of the clinical preventive guidelines for women was identified (Barnhart, Lewis, Houghton, & Charney, 2007). An important initial action to undertake prior to any preventive action is to identify and understand the perceived risk of heart disease among women, especially in older and racial minority groups (Lefler, 2009)

### **Healthcare Provider Knowledge and Awareness**

The AHA administered six national surveys (1997, 2000, 2003, 2006, 2009, and 2012) to evaluate the awareness and knowledge of heart disease risk among women (Mosca et al., 2013). In the 1997 study, only one in three women was able to identify CVD as the number one cause of death in women (Mosca et al., 2013). A national campaign was conducted secondary to this finding, to increase the awareness of the risk of women and heart disease to the public and professional groups. Since the initial survey and campaign, the awareness of CVD as the leading cause of death in women has nearly doubled from a low of 30% in 1997 to 56% in 2012 for all women surveyed (Mosca et al., 2013).

It is clear there are three gaps in the existing research. There is an inadequate amount of patient education and health promotion, lack of patient and provider awareness, and lack of adherence to the recommended American Heart Association Guidelines for the Prevention of Cardiovascular Disease in Women. Mosca et al. (2005) conducted the only known study of provider awareness of the AHA guidelines for women to date. An online cross-sectional survey was distributed to 8,550 physicians in the nation, including primary care physicians (PCPs), obstetricians/gynecologists (OB/GYNs), and cardiologists. The survey was administered among a stratified random sample of 500, including 300 PCPs, 100 OB/GYNs, and 100 Cardiologists. A standardized questionnaire with patient profiles was administered to ascertain the barriers and to evaluate the awareness and implementation of the CVD Prevention Guidelines for women by each specialty (Mosca et al., 2005). Physician awareness and adoption of the CVD Prevention Guidelines differed by specialty. Cardiologists had the highest level of awareness among the three groups at 80%, with approximately 60% awareness for PCPs and OB/GYNs (Mosca et al., 2005). Cardiologists and PCPs were more likely to implement prevention guidelines for women

at a rate of 40% or less, if they stated they were aware of the AHA guidelines. OB/GYNs self-reported adoption of the guidelines was approximately 20% (Mosca et al., 2005). In addition, Mosca et al., (2005) found recommendations concerning lifestyle, over-the-counter supplements, and aspirin differed among the specialties. Lifestyle interventions, which include physical activity and dietary counseling, are recommended for all women, however in the low-risk group, sharing these recommendations was suboptimal among all physician groups (46-68%). The low risk group has a 10-year Coronary Heart Disease (CHD) <10% absolute risk according to the Framingham Risk Score (FRS) (Mosca et al., 2005).

The FRS was published in 1998 as a 10-year CAD risk calculator. It became the standard globally for clinical decision-making in preventative care (Forrester & Harold, 2014). The origin of the FRS dates back to the Framingham Heart Study in 1948. At the time of World War II, there was an epidemic of CVD with 44% of US deaths attributed to CVD, which was a 20% increase since 1940. One of the contributing factors included free cigarettes provided to soldiers (Forrester & Harold, 2014). The public awareness of heart disease became evident with the knowledge of President Franklin Delano Roosevelt's health decline and ultimate death from a cerebral hemorrhage. He suffered from severe hypertension, which was considered part of the normal aging process. An acceptable systolic blood pressure was 100, plus the individual's age. President Harry Truman, after Roosevelt's death signed the National Heart Act into law, which established the National Heart Institute (NIH). The law also contained a grant for the Framingham Heart Study, a 20-year epidemiologic study (Forrester & Harold, 2014). The study originated in Framingham, Massachusetts, which investigators believed, represented a perfect description of middle class, multiethnic America. The focus of the study was to investigate factors that lead to CVD development through long-term follow-up. Half of the study

participants were women, which was different than previous epidemiologic studies. The Framingham was broadened to recruit the children of original study participants after the 20-year period (Forrester & Harold, 2014). The risk factors for CAD was first published in 1961 based on the Framingham study. The seven original risk factors included age, systolic blood pressure, number of cigarettes smoked, total cholesterol, electrocardiogram abnormalities, weight, and hemoglobin. As study findings evolved over time, diabetes and cholesterol sub-fractions (HDL and LDL) were included with the FRS for CAD publication in 1998 (Forrester & Harold, 2014). Three categories were established based on 10-year risk and adopted by the Adult Treatment Panel of the National Cholesterol Education Program (ATP/NCEP) guidelines. These categories are low-risk: 10-year event rate <10%; high risk: 10-year rate >20%; and intermediate risk: 10-year event rate between 10-20% (see flow diagram for CVD preventive care in women in Appendix D).

The Mosca et al. (2005) survey of 500 physicians cited earlier found that physicians reported spending an average of eight minutes recommending lifestyle changes with their patients with less than 5% of physicians reporting counseling women patients to participate in physical activity most days of the week. Patients who were deemed at high risk for CVD (10-year rate >20%) were often referred to nutritionists. Dietary supplements, which include multivitamins, omega-3 fatty acids, and folic acid, were more likely be recommended by OB/GYNs. Aspirin 81 mg was recommended for women identified in the high-risk group for CVD, the majority of the time (90% PCPs, 84% OB/GYNs, and 86% Cardiologists). For women in the low risk group (10-year event rate <10%), aspirin was recommended 29-37% of the time despite not being recommended in the CVD guidelines (Mosca et al., 2005). Lipid management varied by physician specialty, with OB/GYNs less likely to endorse diet counseling or statin

therapy in the high-risk group regardless of the LDL-C (>100 mg/dL). Many OB/GYNs advised over-the-counter niacin, not recommended in the guidelines (Mosca et al., 2005). The first key finding of this study found women were assigned in a lower risk group than men despite a comparable calculated risk according to the FRS. The second key finding was the awareness of CVD and adoption of the CVD prevention guidelines differed among physician specialties. OB/GYNs as a physician specialty were significantly less aware of the CVD guidelines, adhere to the guidelines, and subsequently less likely to be successful in managing the cardiovascular risk factors, while the study found that 67% of the OB/GYNs provided primary care for their female patients (Mosca et al., 2005).

The practice of primary prevention of CVD in women, especially those of reproductive age was explored in a similar study. Barnhart et al. (2007) administered a survey to 529 internists and OB/GYNs to identify the knowledge and barriers to adopting the recommended CVD prevention guidelines for women. Internists were found to have increased knowledge of the clinical guidelines for management of cardiovascular risk factors as compared to OB/GYNs (mean of 9.6 correct responses  $\pm$  1.7 vs. mean of 8.6 correct responses  $\pm$  1.6;  $p = .001$ ). Neither group reported including risk reduction strategies in their patient's standard care consistently. An example is smoking cessation, as 67% of internists and 54% of OB/GYNs recommended a quit date, 75% of internists and 51% of OB/GYNs supplied a nicotine replacement prescription, and 47% of internists and 36% of OB/GYNs referred for counseling (Barnhart et al., 2007). For overweight women, 91% of internists and 82% of OB/GYNs offered nutritional advice with 61% of internists and 51% of OB/GYNs referring women for weight management. Time and lack of adequate training in the CVD risk prevention guidelines for women were reported as barriers by both internists and OB/GYNs (Barnhart et al., 2007).

Lastly, a qualitative study was conducted to understand and improve the role of the OB/GYNs in CVD risk screening and prevention. Five themes were identified that included professional identity, knowledge and skills, potential for liability, office and practice structure, and practice community and support for collaborative care (Ehrenthal et al., 2011). Discussion of barriers and suggestions for strategies were considered in the focus groups. It was acknowledged that more education and training, referral networks, and established evidence-based screening specialized to women could potentially increase the role of the OB/GYN provider in CVD preventative care for women (Ehrenthal et al., 2011).

### **Concepts and Definitions**

**Risk.** An analysis of the concept risk is fundamental in understanding the relationship to coronary heart disease. According to online Merriman Webster dictionary, risk can be a noun or a verb. The noun definition is

Possibility of loss or injury; someone or something that creates or suggests a hazard; the chance of loss or the perils to the subject matter of an insurance contract; the degree of probability of such loss, a person or thing that is a specified hazard to an insurer, and an insurance hazard from a specified cause or source; or the chance that an investment (as a stock or commodity) will lose value (Merriam-Webster's Online Dictionary, 2013).

Shattell (2004) analyzed the concept risk and provided a new definition of risk. She stated that this new definition could furnish lucidity and a focus on future research. Therefore, risk is defined as

a chance or potentiality for loss or harm, a cognitive recognition involving thought and perception about self and/or others, and a decision-making process based on probability or a weighing of the possibilities or potentialities- is a cognitive awareness either on the

part of an individual or by an “other,” which includes a decision-making process, as well as a chance of harm or loss. (Shattell, 2004).

Dalusung-Angosta (2010) also did an extensive literature review and stated there was no single definition of risk that was correct. She states that the definition is contingent on the individual defining it and the circumstance. Furthermore, the perception of risk can be interpreted as negative. This author believes that risk can be positive if healthy activities are adopted to improve one’s risk or chance of developing a disease, in this case, CHD.

The concept of risk was explored in the context of CHD and women. An extensive literature search identified some common attributes. They include danger, hazard, obstacle, uncertainty or ambiguity, threat, probability, chance or potential of loss or harm, something adverse, sign of future disease, clinical doubt concerning diagnosis, and a cognitive acknowledgement involving thought, perception, and decision process based on chance (Dalusung-Angosta, 2010; Jacobs, 2000; Shattell, 2004). An awareness of the risk of CVD in women is significant as the first step to reducing the risk of CVD in women.

**Susceptibility.** Susceptibility is defined as “the state of being easily affected, influenced, or harmed by something” (Merriam-Webster's Online Dictionary, 2015). Medical and biological definition includes “a state of being open to disease or infection; state of being readily affected or acted upon; diminished immunity to disease, especially to an infection; and the likelihood of an individual to develop ill effects from an external agent” (Parkin & Balbus, 2000, p.605). The concept of susceptibility is used in the CVD risk assessment of women and subsequent susceptibility to develop heart disease.

### **Theoretical Framework**

The knowledge and awareness of the CVD prevention in women guidelines require a thoughtful process of adoption of this idea or practice. Everett Rogers developed the Diffusion of Innovations Model in the 1960's around his research that demonstrated an adoption pattern for new ideas and concepts over time by individuals or groups in a social system or culture. The theoretical framework explains how an innovation is communicated and adopted along with the potential barriers (Greenhalgh, Robert, Bate, Macfarlane, & Kyriakidou, 2005). The four main elements in the diffusion of a new idea or practice are innovation, communication channels, time, and social system as shown in Appendix C (Rogers, 2003).

An innovation is an idea that is recognized as new or different by a person or group. The five attributes are relative advantage, compatibility, complexity, trialability, and observability. (Rogers, 2003). The features of an innovation as recognized by a person or a healthcare provider determines the speed the particular idea is adopted. This DNP project innovation is the adoption of the 2011 Update on the Effectiveness-based Guidelines for the Prevention of CVD in Women published by the American Heart Association (Mosca et al., 2011) by healthcare providers at selected university medical school clinics in the Southeastern United States.

The communication channel is the manner in which the knowledge and practice of the Guidelines for the Prevention of CVD in Women are conveyed to other healthcare providers as shown in Appendix C. A new idea or practice as demonstrated with evidence-based guidelines are more likely to be adopted if communicated with peer colleagues who have adopted the guideline and communicated their evaluation (Rogers, 2003).

Time as the third element encompasses the initial knowledge of the innovation (guideline) to the individual development of an opinion of a guideline and subsequent decision to

adopt or decline to the actual implementation of the guideline into clinical practice. The five stages in this process are knowledge, persuasion, decision, implementation, and confirmation (Rogers, 2003). There are five adopter categories in a social system based on the degree of adoption over time. They are the innovators, early adopters, early majority, late majority, and laggards (Rogers, 2003).

The final element in the diffusion of innovations is a social system, which are composed of individual members, informal groups, organizations, and/or subdivisions (Rogers, 2003). Social systems are the primary care and specialty clinics, patients, and healthcare provider separately and collectively as shown in Appendix C. All have a common objective of delivering and receiving the best care. The structure within a social system can determine the success of the adoption of an innovation. The roles that opinion leadership and change agents take on within a social system determine the diffusion of innovation (Rogers, 2003).

### **Key Concepts in the Diffusion of Innovation**

**Barriers.** The author recognized several barriers to the implementation of the guidelines. The first barrier was the perceived lack of knowledge and awareness of healthcare providers that heart disease is the number one cause of death in women as well as men. The second barrier was the lack of knowledge and adherence/adoption of the evidenced-based guidelines for the prevention of CVD in women by healthcare providers. There is one known study of healthcare provider knowledge and adoption of these guidelines, which was conducted in 2004 among physicians in primary care, cardiology, and obstetrics/gynecology (Mosca et al., 2005). Physician awareness and adherence/adoption differed by specialty. The third barrier is the number of guidelines as healthcare providers are challenged to know every guideline specific to their practice (Cabana et al., 1999). Other barriers include the difficulty of accessing guidelines and

the inability to implement guidelines while carrying a full patient load with complex problems (Powell-Cope, Luther, Neugaard, Vara, & Nelson, 2004).

Sustainability is another potential barrier in the diffusion of incorporating guidelines specific to prevention of CVD in women with the ability to maintain and sustain this practice along with adjustments to any new updates (Greenhalgh et al., 2005). Indirect costs related to time it would take to train staff in the utilization of guidelines is another barrier (Wejnert, 2002a).

**Adopters.** Rogers (2003) defines adoption as “the decision to make full use of the innovation as the best course of action available” (p. 473). Therefore, adopters are those individuals and/or organizations that embrace and commit to an innovation and communicate the diffusion or dissemination through any and every available channel available. There are five adopter categories based on an innovation, which is influenced by communication channels, time, and a social system (Rogers, 2003).

**Adopter categories.** Innovators tend to be adventurous and bold with new ideas (Rogers, 2003). This scholarly project is not a new idea, but one that required an investigation of the current knowledge and awareness of the AHA guidelines for women by administering a survey to the healthcare providers. This author is proceeding as the innovator to diffuse the guidelines for women with expectations of increased interest in women and heart disease along with expected obstacles of provider resistance.

Early adopters are integrated in the social system more than innovators (Rogers, 2003). Identifying champions at each clinic setting facilitates the adoption of an innovation. Recognizing the unique gender characteristics of heart disease is the basis for promoting the adoption of guidelines for women.

Early majority is a large category of people, who will adopt an innovation before the typical member in a social system (Rogers, 2003). The university medical school clinics was the social system identified

Later majority is another large category of people who tend to be skeptical and adopt an innovation after the typical member in a social system (Rogers, 2003). This author anticipates healthcare provider resistance to an additional guideline in the evaluation of women and heart disease.

Laggards are the last in a social system or organization to adopt an innovation (Rogers, 2003). Resistance to change or acceptance that heart disease and gender differences exist will be evaluated after the scholarly project is further implemented after graduation.

A professional organization as the American Heart Association (AHA) is an influential adopter factor and facilitator as a group in determining the adoption and dissemination of the Preventive Guidelines for Women. Besides the gender-specific guidelines for preventative care, the AHA authors a multitude of guidelines related to the care of the cardiovascular patient. The predictive authority of a provider's position within an organization or clinic can determine if an individual has any influence to be an adopter (Wejnert, 2002b). The author is an early adopter along with the women cardiologists in this current clinical practice as the current guidelines and recommendations are incorporated in their plan of care in women. The first steps in the process of adoption are awareness and gaining information/knowledge (Greenhalgh et al., 2005). Adoption of the current guidelines by the entire physician practice versus by individual providers is complex and beyond the scope of this paper. The author may be able to identify healthcare champions in each clinic who adopt the guidelines early and serve as clinical resources for others in their practice. It is this author's belief that women healthcare providers most likely would be

adopters of the guidelines and continue to convey the importance of women-specific CVD risk prevention guidelines as women themselves. Homogeneity with women healthcare providers and an understanding of the differences in heart disease in women will assist in the diffusion of this innovation (Wejnert, 2002b).

### **Facilitating Factors**

Technology availability of an electronic health record (EHR) would facilitate the School of Medicine clinic's documentation of the evaluation of CVD in women. Examples include prompts for CVD risk analysis and flow sheets to trend components of patient assessment (BP, BMI, waist circumference, and depression screening). This would allow a seamless integration and communication among healthcare providers in primary care practices and specialty practices of cardiology and obstetrics/gynecology. In the rural medical school's EHR system, networking through the health record and electronic mail is available real-time to improve communication among colleagues. In addition, educational efforts to provide information about women and prevalence of heart disease can be achieved through clinic websites that will offer links to reputable websites concerning women and heart disease. An example would be the American Heart Association, see Appendix C.

### Chapter III: Methodology

#### Needs Assessment

Healthcare quality improvement and patient care driven outcomes, are the basis of evidence-based guidelines (Sesé-Abad et al., 2014). Current practice, healthcare provider attitude or barriers, and provider knowledge or skill drove the DNP project questions identified after a literature review of women and heart disease:

- Is there a difference in knowledge of women and heart disease between primary care, cardiology, and OB/GYN practices or providers?
- What are the barriers in the adopting the provision of CVD risk factor therapies in women?
- Is there a difference in the practice of women and heart disease between primary care, cardiology, and OB/GYN practices or providers?

#### **Knowledge difference between primary care, cardiology, and OB/GYN**

**practices/providers.** Six survey questions addressed knowledge of women and heart disease.

1. Which factors place a woman at HIGH RISK for CVD? Select all that apply:  
clinically established coronary artery disease, cerebrovascular disease, peripheral arterial disease, abdominal aortic aneurysm, diabetes mellitus, chronic kidney disease, 10-year predicted CVD risk equal or greater than 10% (according to the Framingham Risk Score). All factors were correct which indicated a woman was at high risk for CVD.
2. Which factors place a woman at risk for CVD? Select all that apply: cigarette smoking; systolic BP greater than 120 mmHg or diastolic BP greater than 80 mmHg,

- or treated hypertension; total cholesterol greater than 200 mg/dL, HDL-C less than 50 mg/dL, or treated dyslipidemia; obesity, especially central adiposity; poor (non-healthy) diet; physical inactivity; family history of premature CVD occurring in first-degree relatives, in men less than 55 years of age or in women less than 65 years of age; metabolic syndrome; evidence of advanced subclinical atherosclerosis, i.e., coronary artery calcification, carotid plaque, or intimal media thickness; poor exercise capacity on treadmill test and/or abnormal heart rate recovery after stopping exercise; systemic autoimmune collagen, i.e.: vascular disease; and history of pre-eclampsia, gestational diabetes, or pregnancy-induced hypertension. All these factors were correct. Incorrect choices were spouse with CVD and fibromyalgia.
3. Which factors denote ideal cardiovascular health for women? Select all that apply: total cholesterol less than 200 mg/dL, untreated; BP less than 120/80, untreated; fasting blood glucose less than 100 mg//dL, untreated; body mass index less than 25 kg/m<sup>2</sup>; physical activity greater than 150 minutes per week of moderate intensity, or greater than 75 minutes per week of vigorous activity, or a combination of both; and a healthy (DASH-like) diet. The four incorrect choices were electronic cigarette smoking, antioxidant vitamin supplements, moderate alcohol use (more than two drinks per day), and hormone therapy.
  4. Are you aware of the evidence-based guidelines published by the American Heart Association (AHA) for treatment and prevention of CVD in women?
  5. Two case scenarios were presented to evaluate the current knowledge or the implementation of the guidelines with multiple choices for respondent's recommendations for management (see Appendix E).

**Barriers affecting the provision of CVD risk factor therapies.** Three survey items addressed the barriers providing CVD risk treatments.

1. How effective do you feel you can be in helping women patients: understand the risk of heart disease, manage their weight, stop smoking, maintain an adequate level of physical activity, eat a heart healthy diet, lower their LDL cholesterol, increase their HDL cholesterol, keep their BP at 120/80 or better, prevent a heart attack, and take medication as prescribed? The possible choices were- not very effective, slightly effective, effective, and very effective.
2. Statements that some healthcare professionals have made regarding CVD prevention in women. Indicate how much you agree or disagree: more primary prevention should be done with patients, however, the time constraints of a typical patient visit does not allow it; if insurance companies provided better reimbursement for lifestyle interventions; for example weight loss and smoking cessation, I would spend more time doing it; my greatest barrier to prevention of heart disease is the patient themselves; many clinical guidelines, although ideal, are impractical for the staff or myself to implement; I am more likely to adopt treatment guidelines into practice that are published by professionals within my specialty; the existence of multiple treatment guidelines, each with somewhat different recommendations, makes it difficult to determine which guideline is the best to use with my patient; more women than men die each year from CVD; I am willing to seek additional training if it would allow me to better engage in preventative health treatments for CVD in women; counseling patients on preventative treatment who are not willing to take control of their health is largely ineffective; depression in CVD patients is common and goes

undiagnosed; and my personal clinical judgement is usually more effective than clinical guidelines in improving health outcomes for patients. The four possible responses were strongly agree, agree, disagree, or strongly disagree.

3. What are your barriers to the utilization of evidence-based clinical guidelines? Select all that apply: lack of time to spend with patients; lack of reimbursement; multiple guidelines, each with somewhat differing recommendations, makes it difficult to determine what is best for patients; patients do not adhere to recommendations; and no reported barriers to utilization of evidence-based guidelines.

### **Practice difference between primary care, cardiology, and OB/GYN**

**practices/providers.** Six practice questions addressed healthcare provider practice patterns.

1. In your initial evaluation for CVD risk in women, how often do you obtain: a medical history, family history, pregnancy complication history, fasting lipid profile, fasting glucose, coronary artery calcium score, Framingham risk assessment on women without CVD, and an atherosclerotic cardiovascular disease (ASCVD) Risk Estimator® on women without known CVD? Possible responses included never, rarely, most of the time, and all of the time.
2. In your initial evaluation for CVD risk in women, does your physical exam include: blood pressure (BP) recording, body mass index (BMI) calculation, and waist circumference? Responses ranked from never to all the time.
3. How often do you administer a depression-screening tool in women? Responses ranged from never to all of the time.
4. How often do you recommend the following lifestyle recommendations? Lifestyle recommendations included dietary approaches to stop hypertension (DASH)-like diet,

regular physical activity, smoking cessation, and weight management. The options were all of the time, most of the time, rarely, and never.

5. Do you have a system in place for tracking patient adherence to recommended lifestyle changes (diet, exercise, smoking cessation)?
6. Which of the following do you use for locating the most current clinical guidelines: American College of Cardiology, American Heart Association, Epocrates® , Google Scholar, Google/Yahoo/Bing, University Health Science Library, Lexicomp® Medscape® , Micromedex® , National Guidelines Clearinghouse, NP/PA/MD colleague, PubMed® , and Up to Date®?

Demographics included age, gender, race/ethnicity, title, practice site, and years in clinical practice.

### **Project Design**

A quantitative, exploratory descriptive research design was used. An internet-based survey was used to examine the knowledge, attitude, and practice of the CVD Prevention Guidelines for Women among healthcare providers in primary care and selected specialty practices in clinics of a southeastern rural US medical school.

**Sample.** A convenience sample of providers included 147 nurse practitioners (NPs), certified nurse midwives (CNMs), physician assistants (PAs), and physicians in specialty (cardiology and OB/GYN) and primary care settings in the medical school clinics to evaluate the knowledge of the latest 2011 American Heart Association Guidelines for the Prevention of Cardiovascular Disease in Women. Demographics included age, gender, race/ethnicity, title, practice site, and years in clinical practice.

**Method.** Electronic mail addresses were provided by the credentialing office of the university medical school. Collection of data was structured in a voluntary, self-administered anonymous internet electronic survey using Qualtrics®.

**Instrument.** An existing survey tool, “Current Practices for Prevention of CVD” (see Appendix E) was modified to answer the questions posed in this DNP project. This survey was provided with permission to use and adapt by Mosca et al., (2005) and the AHA. The original survey was lengthy with 45 questions and 10 patient cases. Since Mosca’s survey was administered to physicians only, some questions were geared toward physicians’ practice characteristics. The original survey included more in-depth questions concerning patient management. The adapted survey was pared down to 21 questions designed around practice, attitude, and knowledge components with designated response options (Polit, 2012a). Practice-specific questions included evaluation of CVD risk in women, components of physical examination, performance of depression screening, and recommendation of lifestyle changes. Attitude-specific questions included evaluation of effectiveness in helping patients and barriers to utilization of evidence-based clinical guidelines. Finally, knowledge-type questions included recognition of the high risk, at risk, and ideal CVD healthy female. In addition, two female patient scenarios were incorporated into the survey to assess knowledge of the AHA Effectiveness-based Guidelines for the Prevention of CVD in Women.

The survey was transposed into Qualtrics®. Qualtrics® Research Suite is a web-based survey software program, licensed by East Carolina University (ECU, 2014) and utilized to develop and distribute surveys. Application to the Institutional Review Board (IRB) was made on November 6, 2014 and assigned #14-001595. Approval was obtained on December 11, 2014. An amendment to the IRB was submitted after minor survey questions changed and recruitment

electronic letter composed. IRB amendment approval was received on February 9, 2015. The survey was launched on February 18, 2015 (see Appendix L and M).

Since this survey was completely anonymous, all information gathered in the survey was stored in a university secure, password protected, locked network web folder designated as the “Pirate Drive.” This online storage folder has adequate and appropriate firewalls for participant protection. After three years, all the data will be deleted. No personal information or confidential information was requested. No oral or written linkage to the participant can occur or will be made with this study. Internet Protocol (IP) addresses will not be retained for any participant.

The survey was distributed to peer students and faculty for feedback with suggestions for revisions. The average completion time was less than 10 minutes. Following survey revisions, a content validity assessment tool was developed and distributed to a small sample within each practice site and to each type of healthcare provider. The content validity index (CVI) was computed by taking each item with a rating of 3 or 4 on the 4-point relevance scale, divided by the number of respondents. The relevance rating was as following: 1- not relevant, 2- somewhat relevant, 3- quite relevant, and 4- highly relevant (Polit, 2012a). The content validity of the survey questions were evaluated by experts; five NPs, one PA, one CNM, and one cardiologist. The CVI was 3.5, with the majority of the responses of 11 items assessed at highly relevant. One item, which asked if the provider performs a depression screening, yielded a somewhat relevant response by one respondent and quite relevant by another. This suggested that this item might require further exploration. Reliability and factor analysis was not conducted.

Survey activation followed IRB approval and amendment approval. Changes to the survey were made based on IRB suggestions for wording changes, an e-mail cover letter, and coding responses by assigning a numerical code (Pallant, 2013). Limitations of an internet

survey include bias from the non-representative population type, self-selection of participants, and low response rate (Eysenbach, 2004). After the initial Qualtrics® survey was activated, e-mail completion reminders were sent out at week 2 and week 3. The Checklist for Reporting Results of Internet E-Surveys (CHERRIES) tool for developing and improving the quality of a web-based survey was created. (Eysenbach, 2004). The results of the CHERRIES tool are located in Appendix F.

### **Outcome Variables**

Descriptive statistics were used to describe the data. The project variables were based on three components of the DNP project questions: knowledge, attitude, and practice. Independent variables include age, gender, ethnicity, healthcare provider type, practice site, and years of practice. Dependent variables include women and CVD knowledge, evaluation of women and heart disease, and perceived barriers (see Appendix H).

### **Analysis Plans**

Structured questioning allocated the percentages of survey responses and statistical computations (see Appendix I). This form of questioning did not explain the reason a certain response was selected as unstructured questions would. Even though, much of information can be obtained through surveys, it did not explain the thought process of individuals or intricacies of decisions in identification response (Polit, 2012b). The data was prepared for analysis by using the Statistical Package for Social Sciences® (SPSS). The results were initially reviewed to determine if there was a difference in the evaluation of women and heart disease between primary care, cardiology, and OB/GYN practices and if there was a difference in knowledge of women and heart disease between primary care, cardiology, and OB/GYN practices. Finally, the barriers affecting the provision of CVD risk factor therapies in women were identified according

to healthcare provider type and practice site. One analysis concern identified was the survey questionnaire was initiated but never completed by two participants. A decision whether to include the completed responses on the incomplete surveys was based on individual survey items. Likert responses for questions concerning attitude/barriers were limited to four possible responses.

### **Resources/Cost Analysis**

Direct costs estimated at \$150 included printer paper, tape measures for clinics to measure waist circumferences, dedicated flash drive for DNP scholarly project, and gift cards for survey development and statistics assistance. Indirect cost included investigator's salary multiplied by the number of hours (500) devoted to the project in lieu of vacation time was estimated at \$27,000. Funding included ECU College of Nursing, Eunice Smith and Timmie DeSimone scholarships, which totaled \$5,000.

### Chapter IV: Results

A statistical analysis of the data obtained from the survey questions was performed using Statistical Package for Social Sciences (SPSS®) software (version 22). The survey was sent to 147 healthcare providers practicing in the university medical school clinics with reminders sent at two consecutive weeks. There were 41 responses yielding a response rate of 28% (see Appendix F). Univariate descriptive statistics were utilized including frequencies, means, mode, and percentages. Difference of groups was not achieved since a convenience sample of at least five CNMs was not obtained. Cross tabulation to compare different healthcare provider's responses to the identified barriers to CVD preventative care was calculated. The majority of respondents were physicians at 61%, followed by nurse practitioners at 19.5%. The remaining respondents were physician assistants at 12.2% and certified nurse midwives at 7.3%. The average age of the respondents was 48.4 years with a mean of 17 years of experience (range 1-43 years). Providers identified the following clinic practice sites as Cardiology (34.1%), Family Practice (29.3%), OB/GYN (17.1%), Internal Medicine (12.2%), and other (7.3%), refer to Table J1.

The total number of knowledge responses for all survey questions added up to 42 possible responses. The maximum number of correct responses equaled 31. The frequency and percent of responses were tallied using SPSS®, along with the knowledge percentage (68-100%), and knowledge percentages of CNMs, NPs, PAs, and MDs. The total number of correct responses ranged from 21 to 31, with 9.8% of total respondents recording all correct responses, refer to Figure K1. Nurse practitioners yielded the highest percent of correct responses at 91.1% with nurse midwives generating the lowest at 83.9%, refer to Table K1.

Multiple barriers were identified that prevent adherence to clinical guidelines (Cabana & Kim, 2003; Mosca et al., 2005). In this survey, providers were asked to select barriers that impede the utilization of evidence-based clinical guidelines in their practice. Barriers identified included lack of time to spend with patients, lack of reimbursement, multiple guidelines; each with somewhat varying recommendations, and patients non-adherence to recommendations. The barriers frequently chosen were multiple guidelines (70%), lack of time to spend with patients (67.5%), and patients who do not adhere to recommendations (67.5%). A very small number of participants reported no barriers ( $n = 2$ , 5%). Statements in the survey statements addressed potential barriers and healthcare provider attitudes. The following possible responses were strongly agree, agree, disagree, and strongly disagree; strongly agree with agree were coded as “1” and disagree with strongly disagree were coded as “0”. All participants (100%) identified depression in CVD patients as common and undiagnosed. The statement, “I am willing to seek additional training that allows me to better engage in preventative health treatments for CVD in women” was confirmed by 95% of all healthcare providers surveyed, with 100% agreed by NPs, CNMs, and PAs; physicians by 92%. The statement, “more primary prevention should be done with patients, however time constraints of a typical patient visit does not allow it” was identified by 90% of all healthcare providers surveyed with 100% agreement by NPs, CNMs, and PAs and 83% of physicians. The statement, “multiple treatment guidelines, each with somewhat different recommendations, makes it difficult to determine which is the best to use with my patient” was identified by 83% of healthcare providers surveyed. Lastly, 65% agreed with the following statement: “more women than men die each year from CVD”, refer to Table K2.

Another questionnaire item asked how effective providers believed they could be helping women patients with possible responses: effective, very effective, not very effective, and slightly

effective. The participant responses were recoded to numerical values. A value of “1” was assigned to “effective” and “very effective” with a value of “0” assigned to “not very effective” and “slightly effective.” The majority of respondents (93%) believed they could be effective in getting women to understand the risk of heart disease with NPs and PAs at 100%, MDs at 92%, and CNMs at 67%. The item asking how effective they believed they could be in helping women to take medications as prescribed was selected by 88% of survey respondents with 100% of NPs and PAs, MDs at 87.5% and CNMs at 33%. The same responses and percentages were seen with the respondents who believed they could help women maintain a BP at 120/80 or better. Only 58% of all providers believed that they could help their female patients maintain an adequate level of physical activity and increase their HDL cholesterol, refer to Table K3.

The final barrier question asked participants to identify barriers to the utilization of evidence-based guidelines in their practice. The responses included multiple guidelines, each with varying recommendations, making it difficult to determine what is best for their patients (70%); lack of time to spend with patients (67.5%); patients do not adhere to recommendations (67.5%); and lack of reimbursement (35%). Only two respondents (5%) stated they had no barriers to applying the guidelines to their patients, refer to Figure K2.

The following questions addressed the practice patterns of the providers surveyed. Question 7 asked respondents in their initial evaluation for CVD risk in women, to state how often they obtained a medical history, family history, pregnancy complication history, fasting lipid profile, fasting glucose, coronary artery calcium score, Framingham risk assessment, and ASCVD Risk Estimator®, refer to Table K4 and K5. The Framingham Risk Score (FRS) was utilized by 32% of the healthcare providers surveyed in the initial evaluation for CVD risk in women, with 80% of the PAs using it and CNMs not using it at all. When the 10-year predicted

risk is greater than 20% based on the FRS, it places a woman at high risk for CVD, however a lower risk score does not guarantee a woman is at a lower risk for CVD (Mosca et al., 2011). An alternative CV risk assessment tool, the ASCVD Risk Estimator® was obtained by 45% of the healthcare providers in the initial evaluation for CVD risk in women. A fasting lipid profile was obtained 90% in the initial CVD risk evaluation by the providers with 100% of the NPs and PAs obtaining this lab profile.

The next practice type question (question 8) asked the respondents if in their initial evaluation for CVD risk, does their physical examination include a BP recording, BMI calculation, and waist circumference measurement. Waist circumference was obtained by 33% of the healthcare providers during the physical examination in the initial CVD risk for women, refer to Figure K3 and Table K6 for physical exam components in the initial CVD evaluation of women by practice site.

Question 9 asked the healthcare providers how often they administered a depression-screening tool. The range of possible responses ranged from 0 (never) to 10 (all of the time). Depression screening was administered all of the time by 7.3% of the respondents and never by 19.5% of the respondents. All of the total responses were divided into three groups for clarity: all of the time, sometimes, or never; refer to Figure K4.

Question 10 addressed healthcare provider's responses for lifestyle recommendations. The four lifestyle recommendations are DASH-like diet, regular physical activity, smoking cessation, and weight management. The responses to this group of questions were recoded with the responses "all of the time" and "most of the time" coded as "1" and "rarely" and "never" coded as "0." One-hundred percent of the providers recommended regular physical activity, weight management, and smoking cessation all of the time or most of the time, as shown in

Figure K5. Regular physical activity as defined as at least 150 minutes per week of moderate exercise, 75 minutes per week of vigorous exercise, or combination of both (Mosca et al., 2011). Smoking cessation includes avoidance of environmental or passive tobacco smoke. A DASH-like diet was recommended all of the time or most of the time by 73% of all respondents with NPs and PAs recommending this lifestyle change most often. Respondents in Cardiology practices recommended a DASH-like diet 100% of time, whereas OB/GYN provider respondents stated they recommend this type of diet 29% of the time, as shown in Figure K6.

Awareness of the evidence-based guidelines published by the AHA for the treatment and prevention of CVD in women was acknowledged by 61.9% of the respondents and varied by practice site as shown in Figure K7. The majority of the respondents (78%) identified their clinical practice did not have a system in place for tracking patient adherence to recommended lifestyle changes and this varied by practice site as shown in Figure K8. The recommendations for lifestyle modifications identified are diet, exercise, smoking cessation, etc. Finally, question 19 asked the respondents to identify which resources they have for locating the most current clinical guidelines. The most frequently cited was the American Heart Association and Up to Date with the least frequent source cited by one respondent as Lexicomp.

## **Chapter V: Discussion**

Initial data suggests an insufficient risk evaluation of women for CVD, specifically waist circumference measurement and depression screening. Survey findings further validate that more education is needed to improve the assessment of CVD risk in women. The need for more learning opportunities for healthcare providers is strengthened based on the high affirmative responses to the statement in the survey that providers were willing to seek additional training in order to better engage in preventative health treatments for CVD in women. Barriers to CVD prevention care in women found in this survey are similar to previous studies (Mosca et al., 2005). Lack of the awareness of the Prevention of CVD in Women Guidelines was found in one-third of respondents. The lack of a system in place for tracking patient adherence to recommended lifestyle changes was identified by almost 80% as a barrier to optimal CVD preventive care. As previously discussed, the FRS does well when a 10-year predicted risk is greater than 20%, which places a women at high risk, however a low risk score does not guarantee a women is at a lower risk for CHD. For this reason, other factors and other risk scores should be considered.

### **Significance of Results to Diffusion of Innovation Model**

Healthcare providers must recognize that there is a gender gap and educate themselves in improving delivery of primary and secondary CVD care to women. Gender specific guidelines and evidence-based treatments as an innovation must be advocated to improve long-term outcomes. Healthcare providers are willing to attend educational sessions to better engage in preventative health treatments for CVD in women.

### **Strengths and Limitations**

#### **Strengths.**

The survey questionnaire was easy to administer and did not require any expenditure except for time. Project findings will be helpful to communicate to other healthcare providers regarding the knowledge of the CVD prevention guidelines for women and barriers to CVD prevention for women.

### **Limitations.**

Limitations included the relatively small sample size and lack of sufficient CNM response, although there was an adequate response by OB/GYN physicians. Adaptation of a survey requires validity and reliability testing of the tool, which is beyond the scope of the DNP education. Since the survey was self-administered, it was difficult to determine if responses were based on actual knowledge and practice or what was perceived to be the correct response. Inferences could not be made based on descriptive statistics alone as no correlation between variable was established. Some survey questions were ambiguous where the respondents had a range of possible choices, i.e. 0 to 10 as in the depression screening. A better option would have been a yes/no response.

### **Recommendations to Practice**

Waist circumference measurement and depression screening are part of the initial implementation stage. Waist circumference measurement was only performed by 33% in the initial evaluation of CVD in women. Depression screening of women was only done “all the time” in 7% of the respondents. In addition, based on the literature and survey findings, depression in CVD is common and goes underdiagnosed. Healthcare providers were willing to seek additional training that allows them to better engage in preventative health treatments for CVD in women as stated by 95% of respondents in survey findings. This allows learning opportunities for the incorporation of the CVD Prevention Guidelines into clinical practice and

implementation of the proper technique for waist circumference measurement and utilization of the depression-screening tool.

Implementation and dissemination of survey results have been introduced to the nurses and medical office assistants in the Cardiology clinic. The proper waist circumference measurement technique and the EPIC® Electronic Health Record (EHR) documentation has been initiated with clinic staff members in small groups with the goal to train all staff members. Training will be offered to the primary care clinics and OB/GYN clinic. Two brief depression-screening tools are currently available in the current EHR, PHQ-2 and PHQ-4. Staff performing the initial work-up prior to the healthcare provider visit can administer this screening questionnaire in less than one minute. There is much work to be done with EHRs in general so they may be utilized to improve the delivery of care.

Grand rounds and/or lunch and learn series will be proposed to the clinic staff and healthcare providers. The survey results will be shared along with changes that can be activated in their clinics and respective EHRs. The challenge remains to assist healthcare providers meet guideline-recommended care and communicate this with their patients. Accountable Care Organizations (ACOs) have been established within the domains of the Affordable Care Act. One of the standards that ACOs are measuring is preventative care This would include blood pressure measurement, weight assessment (waist circumference), tobacco use assessment, and depression screening which is part the CVD risk prevention guidelines for women (Berwick, 2011).

### **Dissemination Plans**

#### **Clinical Practice.**

- Promote interprofessional approaches to identify CVD risks in women.

- Collaborate with the Informatics team to support clinical decision making that is prevention oriented.
- Identify shortcuts or phrases that can be easily located by clinical staff to evaluate and manage women according to the Guidelines for the Prevention of CVD in Women.
- Conduct electronic health record (EHR) audits after education of guidelines are presented; especially to evaluate if waist circumference measurement and depression screening assessment has increased.
- Provide screening questionnaires in waiting rooms for women to read, complete, and discuss with healthcare provider specific to their CVD risk factors.

**Education.** This will include informal, formal, and community efforts.

- Individual or small groups in each clinic. Review guidelines with specific attention to waist circumference measurement and depression screening.
- Clinic inservices, grand rounds, NP conferences.
- Provide education and awareness to women's group, church groups, ethnic groups on gender specific CVD risk assessment and primary/secondary prevention. Promote empowerment of women to take responsibility for their health.

**Scholarship.**

- Dissemination of survey findings to clinics that participated, including Cardiology, Family Practice, Internal Medicine, and OB/GYN.
- Submit manuscript to peer professional journals for healthcare providers from primary care and specialty practices that would increase identification and treatment of CVD specifically for women. The initial submission will be to the Journal of the American Association of Nurse Practitioners (JAANP). Other journals for future consideration

include the Journal for Nurse Practitioners (JNP), Journal of Cardiovascular Nursing, Clinical Scholars Review, and the Journal of Women's Health (JWH).

- Poster presentations at NP conferences, annual collaborative research day through AHEC.
- Share the findings with the American Heart Association, as they have been most generous in their willingness to share their survey tool.
- Submit to NCNA Nurse Practitioner Spring Symposium for CE article or presentation and/or DNP National Conference in Baltimore scheduled for October 2016.

### **Summary**

The Affordable Care Act (ACA) was signed into law March 2010, which was the beginning of comprehensive health care reform for millions of Americans who were uninsured or underinsured. Enrollment into health care insurance programs started October 2013 and over 11 million people in this country have health care coverage that has facilitated more people access to healthcare (Centers for Medicare and Medicaid Services, 2015). The future of preventative care in women is active with two recently announced initiatives. The Center for Medicare and Medicaid Innovation is planning to conduct a five year, randomized control trial to ascertain if paying physicians an incentive for cardiovascular risk prevention will reduce the 10-year predicted risk for atherosclerotic heart disease (Darshak & Sanghavi, 2015). The Agency for Healthcare Research and Quality is providing a grant to assist smaller primary care sites to utilize the latest evidence to improve heart health in the United States (Agency for Healthcare Research and Quality, May 2015).

Identification and evaluation of the knowledge of and barriers to the adoption of the most recent guidelines for the prevention of cardiovascular disease in women is the impetus for the

next step in implementing these evidence-based guidelines. Educational opportunities for staff in primary and specialty care clinics exist and the “innovation” of preventive CVD guidelines that are gender specific and are incorporated in the evaluation of all women is an exciting venture. APRNs can facilitate multi-professional team members in identifying the CVD risks and providing knowledge to the women in their clinics. It is evident that more improvement is necessary towards educating both women and healthcare providers that CVD is the number one killer and largely preventable.

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## Appendix A

## American Association of Colleges of Nursing (AACN) Essentials of Doctoral Education and Project Competencies

Essential	Competency
Essential I: Scientific Underpinnings for Practice	Diffusion of Innovation theoretical model. Change theory. Introduce Guidelines for the Prevention of CVD in Women with the goal of adopting these practice guidelines in clinic settings. Recognize gender disparities and change current practice.
Essential II: Organization and Systems Leadership for Quality Improvement and Systems Thinking	Evaluate current practice organization, meet with key administrator to discuss system status, and proposed changes. Recommended <i>Our Iceberg is melting: Changing and succeeding under any conditions</i> (Kotter & Rathgeber, 2005) and subsequently assigned to clinic leadership.
Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice	On-going literature review of healthcare provider knowledge and awareness of women and heart disease, healthcare provider barriers. Developed a matrix method table to maintain on-going relevant literature.
Essential IV: Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Healthcare	Developed Qualtrics® survey to identify healthcare provider awareness, knowledge, practice, and barriers to women and heart disease. Develop Codebook for data obtained from Qualtrics survey. Identify flow sheet within clinic EHR to document waist circumference and depression screening.
Essential V: Healthcare Policy for Advocacy in Healthcare	Analyzed current health policy critically from the perspective of our stakeholders and reached out to elected official.
Essential VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes	Collaborate with peers, physicians, clinical staff, administrative staff, and clinical informatics staff. Emphasize the importance of CVD risk prevention and management. Implementation of waist circumference measurement and depression screening using PHQ-4.
Essential VII: Clinical Prevention and Population Health for Improving the Nation's Health	Developed, conducted, and participated in community awareness programs. Women's social groups including African-American church group and local educators. Media presentation for local television station.
Essential VIII: Advanced Nursing Practice	Comprehensive and continuous relevant literature updates. Prepare and edit scholarly formal paper. Ongoing power point presentation of scholarly project to DNP faculty and student colleagues. Empower staff to initiate CVD preventative evaluations and management. Prepare for manuscript submission to peer-reviewed journal.

(Moran, K., Burson, R., Conrad, D., 2014)

Appendix B

Literature Search Results

Identified 4595 potentially relevant titles through utilizing Medline, Cumulative Index of Nursing and Allied Health (CINAHL), PubMed, Psychological Information Database (PsycINFO), Google Scholar, and Proquest

446 titles/abstracts reviewed; 65 articles reviewed in full

28 studies reviewed, 10 support project, plus AHA Guidelines for the Prevention of Cardiovascular Disease in Women (2011 update)

Appendix C

Diffusion of Guidelines for the Prevention of CVD in Women

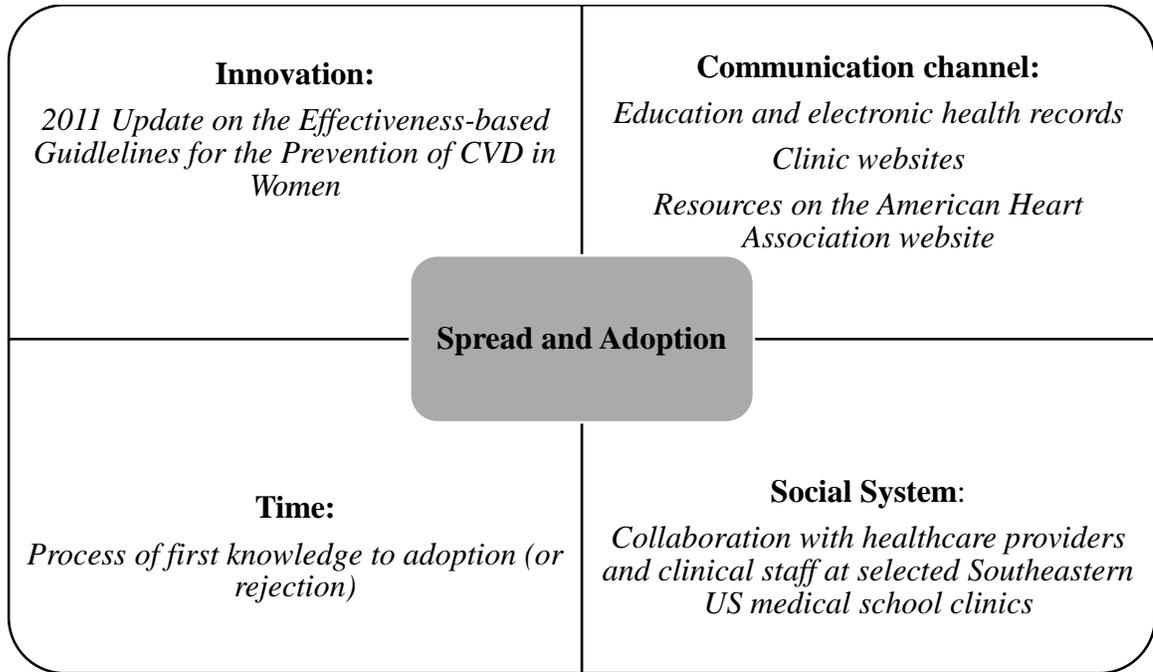
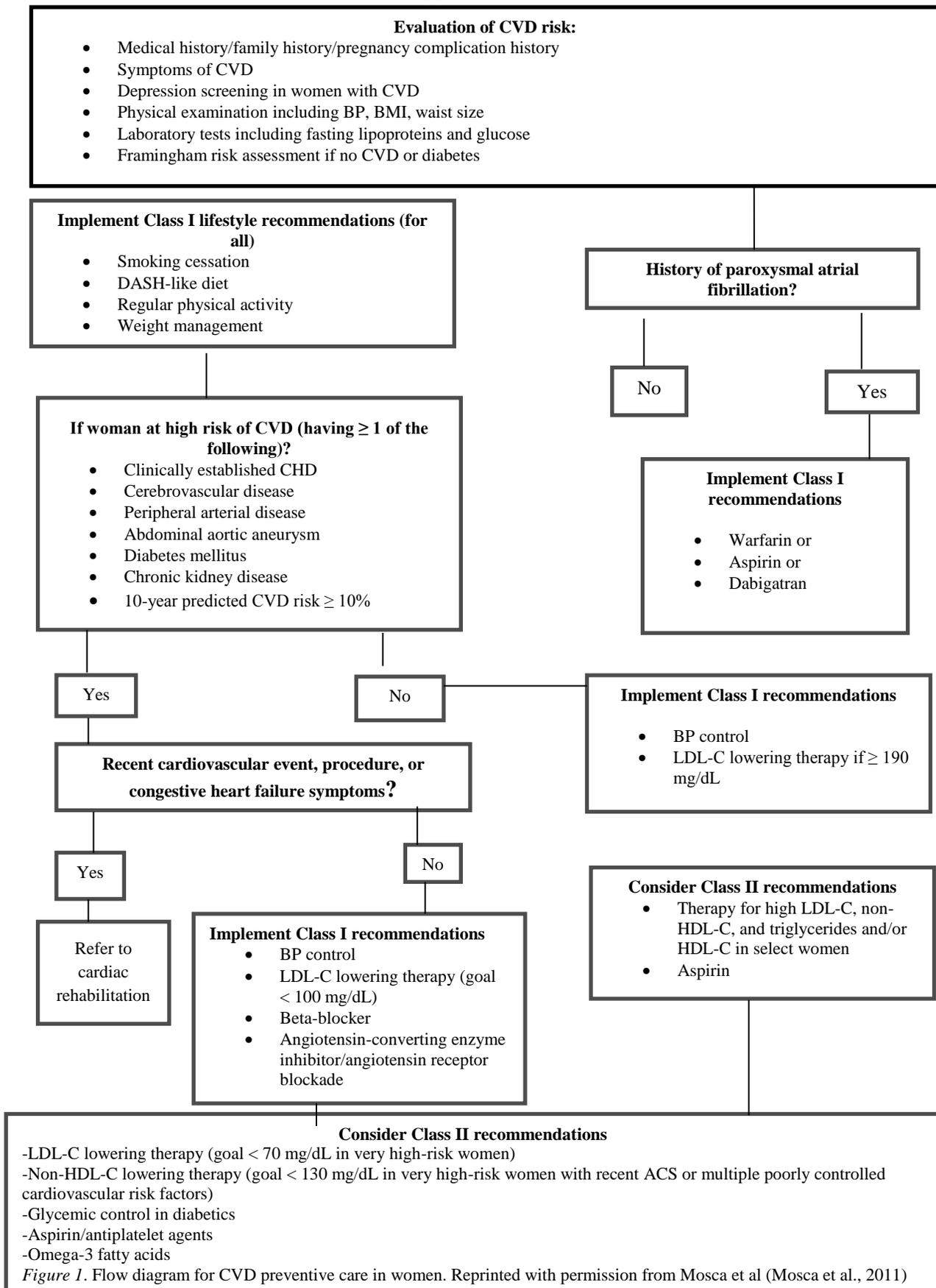


Figure 1. Four elements of Rogers' Diffusion of Innovations theoretical framework and relation to the knowledge and adoption of the CVD Prevention Guidelines in Women (Rogers, 2003).

Appendix D



## Appendix E

## Healthcare Provider Awareness and Knowledge of Women and Heart Disease Survey

## HEALTHCARE PROVIDER AWARENESS AND KNOWLEDGE OF WOMEN AND HEART DISEASE

You are being invited to participate in a survey being conducted by Helene Reilly, FNP-BC, Doctor of Nursing Practice (DNP) student at East Carolina University (ECU), College of Nursing. The purpose of the survey is to identify the knowledge, attitude, and practice of the American Heart Association (AHA) Guidelines in women. If you choose to volunteer in this anonymous electronic survey, you may proceed with the questions. By clicking next, you consent that you are willing to answer the questions. If you choose NOT to participate, you may simply close your Internet browser and no further action is necessary. The estimated completion time is less than 10 minutes. Responses are confidential and cannot be linked you. The risk of participation in this study are minimal. It is possible that you will feel slightly uncomfortable answering certain question(s). All information gathered will be password protected, and has adequate and appropriate firewalls for three years, and then data will be deleted. No personal information or confidential information is requested. No reference (oral or written) linkage to you can occur or will be made with this study. Internet Protocol (IP) addresses will not be retained from any participant. The University & Medical Center Institutional Review Board (UMCIRB 14-001595) has approved this survey. Please call Helene Reilly at 252-744-0771 for any research related questions or the Office of Research Integrity & Compliance (ORIC) at 252-744-2914 for questions about your rights as a research participant.

1. Current age

2. Gender

- Female (1)
- Male (2)

3. Race/Ethnicity

- Asian (1)
- Black/African-American (2)
- Hispanic/Latino (3)
- Native American (4)
- Pacific Islander (5)
- White/Caucasian (6)
- Other (7)

4. Choose the title that best describes your role

- Nurse Midwife (1)
- Nurse Practitioner (2)
- Physician Assistant (3)
- Physician (4)

5. Choose the ECU Physician's practice site in which you spend the majority of your time

- Cardiology (1)
- Family Practice (2)
- Internal Medicine (3)
- OB/GYN (4)
- Other (5)

6. How many years have you been in clinical practice in your role as Nurse Midwife, Nurse Practitioner, Physician Assistant, or Physician?

7. In your initial evaluation for CVD risk in women, how often do you obtain?

	Never (0)	Rarely (0)	Most of the time (1)	All of the time (1)
A medical history (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A family history (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A pregnancy complication history (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A fasting lipid profile (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A fasting glucose (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A coronary artery calcium score (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A Framingham risk assessment on women without known CVD (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
An atherosclerotic cardiovascular disease (ASCVD) Risk Estimator® on women without known CVD (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. In your initial evaluation for CVD risk in women, does your physical exam include?

- \_\_\_\_\_ Blood pressure (BP) recording (1)
- \_\_\_\_\_ Body mass index (BMI) calculation (2)
- \_\_\_\_\_ Waist circumference (3)

9. How often do you administer a depression-screening tool in women?

- 0 (never)
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 (all of the time)

10. How often do you recommend the following lifestyle recommendations?

	All of the time (1)	Most of the time (1)	Rarely (0)	Never (0)
DASH like diet (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regular physical activity (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Smoking cessation (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Weight management (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Read the next 2 questions carefully; HIGH RISK versus AT RISK

11. Which factors place a woman at HIGH RISK for CVD? Select all that apply.

- Clinically established coronary artery disease (1)
- Cerebrovascular disease (2)
- Peripheral arterial disease (3)
- Abdominal aortic aneurysm (4)
- Diabetes mellitus (5)
- Chronic kidney disease (6)
- 10-year predicted CVD risk = or > than 10% (7)

12. Which factors place a woman at risk for CVD? Select all that apply.

- Cigarette smoking (1)
- Systolic BP >120 mmHg or diastolic BP > 80 mmHg, or treated hypertension (2)
- Total cholesterol >200 mg/dL, HDL-C (3)
- Obesity, especially central adiposity (4)
- Poor diet (5)
- Physical inactivity (6)
- Family history of premature CVD occurring in first-degree relatives; in men < 55 years of age or in women (7)
- Spouse with CVD (8)
- Metabolic syndrome (9)
- Evidence of advanced subclinical atherosclerosis; i.e. coronary artery calcification, carotid plaque, or intimal medial thickness (IMT) (10)
- Poor exercise capacity on treadmill test and/or abnormal heart rate recovery after stopping exercise (11)
- Fibromyalgia (12)
- Systemic autoimmune collagen-vascular disease; i.e. lupus or rheumatoid arthritis (13)
- History of pre-eclampsia, gestational diabetes, or pregnancy-induced hypertension (14)

13. Which factors denote ideal cardiovascular health for women? Select all that apply.

- Total cholesterol (1)
- BP < 120/<80 (untreated) (2)
- Fasting blood glucose < 100 mg/dL (untreated) (3)
- Body mass index (BMI) < 25 kg/m<sup>2</sup> (4)
- Electronic cigarette smoking (5)
- Physical activity >150 minutes/week- moderate intensity, OR >75 minutes/week- vigorous intensity, OR combination of both (6)
- Healthy (DASH-like) diet (7)
- Antioxidant vitamin supplements; i.e. vitamin E, vitamin C, beta-carotene, or folic acid (8)
- Moderate alcohol use (>2 drinks/day) (9)
- Hormone therapy (10)

14. How effective do you feel you can be in helping women patients?

	Not very effective (0)	Slightly effective (20)	Effective (1)	Very effective (1)
Understand the risk of heart disease (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Manage their weight (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stop smoking (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Maintain an adequate level of physical activity (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eat a "heart healthy" diet (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lower their LDL cholesterol (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increase their HDL cholesterol (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Keep their BP at 120/80 or better (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prevent a heart attack (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Take medications as prescribed (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. Do you have a system in place for tracking patient adherence to your recommended lifestyle changes; i.e. diet, exercise, smoking cessation?

- Yes (1)
- No (2)

16. Are you aware of the evidence-based guidelines published by the American Heart Association (AHA) for the treatment and prevention of CVD in Women?

- Yes (1)
- No (2)

17. Below are statements that some healthcare professionals have made regarding CVD prevention in women. Indicate how much you agree or disagree with each statement.

	Strongly agree (1)	Agree (1)	Disagree (0)	Strongly Disagree (0)
More primary prevention should be done with patients; however, the time constraints of a "typical" patient visit does not allow it. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If insurance companies provided better coverage for lifestyle interventions (i.e. weight loss and smoking cessation), I would spend more time doing it. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My greatest barrier to prevention of heart disease is the patient themselves. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Many clinical guidelines, although ideal, are impractical for the staff or myself to implement. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly agree (1)	Agree (1)	Disagree (0)	Strongly Disagree (0)
I am more likely to adopt treatment guidelines into my practice that are published by professionals within my specialty. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The existence of multiple treatment guidelines, each with somewhat different recommendations, makes it difficult to determine which is the best to use with my patient. (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
More women than men die each year from CVD. (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am willing to seek additional training that allows me to better engage in preventative health treatments for CVD in women. (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Counseling patients on preventative treatment who are not willing to take control of their health is largely ineffective. (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly agree (1)	Agree (1)	Disagree (0)	Strongly Disagree (0)
Depression in CVD patients is common and goes undiagnosed (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My clinical judgment is usually more effective than clinical guidelines in improving health outcomes in my patients. (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. What are your barriers to the utilization of evidence-based clinical guidelines? Select all that apply.

- Lack of time to spend with patients (1)
- Lack of reimbursement (2)
- Multiple guidelines, each with somewhat different recommendations, makes it difficult to determine what is best for patients (3)
- Patients do not adhere to recommendations (4)
- No barriers (5)

19. Which of the following resources do you have use for locating the most current clinical guidelines?

- American College of Cardiology (1)
- American Heart Association (2)
- Epocrates (3)
- Google Scholar (4)
- Google/Yahoo/Bing (5)
- Health Sciences Library (6)
- Lexicomp (7)
- Medscape (8)
- Micromedex (9)
- National Guideline Clearinghouse (10)
- NP/PA/MD colleague (11)
- PubMed (12)
- Up to Date (13)

Review the following two scenarios; please provide how you would manage these patients in your clinical practice based on the latest 2011 Guidelines for the Prevention of Cardiovascular Disease in Women. Select all that apply.

20. Ms. Johnson is a 40-year-old African-American female with the following profile:

- BMI 32 kg/m<sup>2</sup>
- Waist circumference- 36 inches
- BP 140/100
- Labs- total cholesterol 250 mg/dL, LDL-cholesterol 170 mg/dL, HDL-cholesterol 32 mg/dL, triglycerides 175 mg/dL, HgbA1c 6.5%
- Medications- hydrochlorothiazide 25 mg daily, red yeast rice (over the counter supplement), metformin 500 mg twice daily
- Tobacco use- 40 pack year
- ASCVD risk estimator® - 10 year calculated risk is 48.5%

What is (are) your recommendation(s)? Select all that apply

- Initiate statin therapy (1)
- Omega-3 fatty acid (fish oil) 4 capsules daily (2)
- Start aspirin 81 mg daily (3)
- Start an angiotensin-converting enzyme (ACE) inhibitor (4)
- Lifestyle recommendations- heart healthy diet, regular aerobic exercise, maintenance of desirable body weight, and avoidance of tobacco products (5)

21. Ms. Gonzalez is a 50-year-old Hispanic female with the following profile:

- BMI 32 kg/m<sup>2</sup>
- Waist circumference- 36 inches
- BP 140/90
- Labs- total cholesterol 210 mg/dL, LDL-cholesterol 130 mg/dL, HDL-cholesterol 32 mg/dL, triglycerides 150 mg/dL, HgbA1c 6.5%
- Medications- hydrochlorothiazide 25 mg daily, omega-3 fatty acids (fish oil) 2 capsules daily.
- Non-smoker
- ASCVD risk estimator® - 10 year calculated risk is 4.2%

What is (are) your recommendation(s)? Select all that apply

- Consider a statin (1)
- Increase fish oil to 4 capsules daily (2)
- Start aspirin 81 mg daily (3)
- Lifestyle recommendations- heart healthy diet, regular aerobic exercise, maintenance of desirable body weight (4)

Thank you for your participation. Link attached for 2011 Guidelines for the Prevention of CVD in Women- Attached CVD preventative flow diagram

## Appendix F

Table 1

*Checklist for Reporting Results of Internet E-Survey (CHERRIES)*

<b>Item Category</b>	<b>Checklist Item</b>	<b>Explanation</b>
<b>Design</b>		
	Describe survey design	Convenience sample of nurse practitioners, nurse-midwives, physician assistants, and physicians. Self-selection of Participant self-selection (volunteer effect).
<b>Institutional Review Board (IRB) approval and consent process</b>		
	IRB approval	IRB obtained.
	Informed consent	Consent obtained. Survey purpose and identification of investigator stated. Anonymous electronic survey. Completion time less than 10 minutes. Results saved on password-protected drive for three years, and then data will be deleted.

Item Category	Checklist Item	Explanation
	Data collection	Password protected. No personal or confidential information collected. No reference linkage occurred. Internet Protocol (IP) addresses not retained for any participant.
<b>Development and pre-testing</b>		
	Development and testing	Survey was adapted from an existing survey with permission. Both usability and technical functionality of the survey tested before fielding questionnaire. Survey was pilot tested and content validity was obtained with subsequent revisions.
<b>Recruitment process and description of the sample having access to the questionnaire</b>		
	Open survey versus closed	Closed survey by anonymous survey link
	Contact mode	Contact of providers at East Carolina University (ECU) School of Medicine (SOM) designated clinics via electronic e-mails (e-mails).
	Advertising the survey	Survey reviewed with colleagues. An introduction e-mail letter was sent and “click here to take survey” imbedded in e-mails.

Item Category	Checklist Item	Explanation
<b>Survey administration</b>		
	Web/E-mail	Qualtrics® Research Suite is a web-based survey software program, licensed by ECU sent by link to ECU providers ECU SOM e-mail addresses of providers.
	Context	Qualtrics® Research Suite is a web-based survey software program, licensed by ECU (ECU, 2014). Survey was sent to the ECU SOM providers by email. Once the respondent clicked the survey link in the email, they were directed to Qualtrics® survey.
	Mandatory/voluntary	Voluntary.
	Incentives	No incentives offered.
	Time/date	February 10, 2015 to March 13, 2015.
	Randomization of items or questionnaires	Questions not randomized.
	Adaptive questioning	No adaptive questioning (skip logic) used.
	Number of items	21 items.
	Number of screens (pages)	9 pages.

Item Category	Checklist Item	Explanation
	Completeness check	Survey questions had forced response, excluding age and gender. The Qualtrics® tool allowed this function by highlighting the items the respondent may have missed. Only 2 of 21 items offered “other” as choice.
	Review step	“Back” button on Qualtrics survey tool enabled participants to change their responses.
<b>Response rates</b>		
	Unique site visitor	Unique visitors was determined by IP addresses. 41 unique codes found in recorded responses tab.
	View rate	Unknown.
	Participation rate	42 providers out of 147 providers (28.6%)
	Completion rate	96 % completion mean according to Qualtrics®. 38 out of 42 completed entire survey
<b>Preventing multiple entries from the same individual</b>		
	Cookies used	Unique user identifier for each respondent. Duplicate entries were avoided by checking “prevent ballot box stuffing” in Qualtrics® survey.

<b>Item Category</b>	<b>Checklist Item</b>	<b>Explanation</b>
	IP check	IP address of participant used to prevent potential duplication.
	Log file analysis	No e-mails returned.
	Registration	No log-in required as survey was accessed directly from link provided in e-mail and not available again once survey completed.
<b>Analysis</b>		
	Handling of incomplete questionnaires	Only completed surveys analyzed.
	Questionnaires submitted with an atypical time stamp	Survey completion mean time 10:04 minutes.
	Statistical correction	Codebook assigned a numerical value to each survey item (variable).

(Eysenbach, 2004)

## Appendix G

## Codebook

Codebook				
Question	Variable name	Type	Value	Code
1-Age	AGE	N	11-99	
2-Gender	GENDER	N	1, 2	1-Female 2-Male
3- Race/ethnicity	RACE	N	1-7	1-Asian 2-African American/Black 3- Hispanic/Latino 4-Native American 5- Pacific Islander 6-White/ Caucasian 7-Other
4-Title	TITLE	N	1-4	1-Nurse Midwife 2-Nurse Practitioner 3-Physician Assistant 4-Physician
5-ECU Practice site	ECUSITE	N	1-5	1-Cardiology 2-Family Practice 3-Internal Medicine 4-OB/GYN 5-Other
6- Years clinical practice	YEAREXP	N	1-99	
7-Initial evaluation, do you obtain Medical history	MEDHX	N	1-4	1-Never 2-Rarely 3- Most of the time 4-All of the time

Question	Variable name	Type	Value	Code
Pregnancy complication history	PREGHX	N	1-4	1-Never 2-Rarely 3- Most of the time 4-All of the time
Fasting lipid profile	FLP	N	1-4	1-Never 2-Rarely 3- Most of the time 4-All of the time
Coronary artery calcium score	CACS	N	1-4	1-Never 2-Rarely 3- Most of the time 4-All of the time
Framingham risk assessment	FRAMRISK	N	1-4	1-Never 2-Rarely 3- Most of the time 4-All of the time
8-Initial evaluation, physical exam				
BP recording	BP	N	0-100	0-100
BMI	BMI	N	0-100	0-100
Waist circumference	WAIST	N		0-100
9- Depression screening	DEPRESS	N	0-100	0-100
10-Lifestyle recommendations				
DASH like diet	DASH	N	1-4	1-All of the time 2-Most of the time 3-Rarely 4-Never
Regular physical activity	ACTIVE	N	1-4	1-All of the time 2-Most of the time 3-Rarely 4-Never

Question	Variable name	Type	Value	Code
Weight management	WEIGHT	N	1-4	1-All of the time 2-Most of the time 3-Rarely 4-Never
11-High risk for CVD, select all that apply	HIRISK	N	1-7	1-Clinically established CAD 2-Cerebrovascular disease 3-PAD 4-AAA 5-DM 6-CKD 7-10 year predicted CVD risk >10%
12-At risk for CVD, select all that apply	ATRISK	N	1-14	
13-Ideal CVD health	IDEAL	N	1-10	
14-How effective do you feel you can be in helping women patients understand the risk	URISK	N	1-4	1-Not very effective 2-Slightly effective 3-Effective 4-Very effective
Manage their weight	MANWT	N		1-Not very effective 2-Slightly effective 3-Effective 4-Very effective

Question	Variable name	Type	Value	Code
Maintain adequate level of physical activity	MAINACT	N		1-Not very effective 2-Slightly effective 3-Effective 4-Very effective
Eat "heart healthy" diet	EATDIET	N		1-Not very effective 2-Slightly effective 3-Effective 4-Very effective
Lower LDL-C	LOWLDL	N		1-Not very effective 2-Slightly effective 3-Effective 4-Very effective
Increase HDL-C	INCHDL	N		1-Not very effective 2-Slightly effective 3-Effective 4-Very effective
Keep BP <120/80	BPLOW	N		1-Not very effective 2-Slightly effective 3-Effective 4-Very effective
Prevent a heart attack	PREVMI	N		1-Not very effective 2-Slightly effective 3-Effective 4-Very effective
Take prescribed meds	TAKEMED	N		1-Not very effective 2-Slightly effective 3-Effective 4-Very effective

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Question	Variable name	Type	Value	Code
16-Awareness of guidelines for women	GUIDEAHA	N	1, 2	1-Yes 2-No
17-Statement made by HCP regarding CVD prevention in women, how much agree or disagree			1-4	
18-Barriers to utilization of evidence-based guidelines, check all that apply	BARRIERS	N	1-5	1-Lack of time to spend with patients 2-Lack of reimbursement 3-Multiple guidelines, each with different outcomes, makes it difficult to determine what is best 4-Patients do not adhere to recommendations 5-No barriers
19-Which resources used for locating most current clinical guidelines	RESOURCE	N	1-13?	1 2 3 4 5 6 7 8 9 10 11 12 13
20-Case scenario (Johnson): recommendations	CASE1	N	1-5?	1 2 3 4 5

21-Case scenario (Gonzalez): recommendations	CASE2	N	1-4?	1-Consider a statin 2-Increase fish oil to 4 capsules/day 3-Start Aspirin 81 mg daily 4-Lifestyle recommendations
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## Appendix H

Table 1. *Measurement of study variables:*

Variables	Measurement	Source
Age groups	Ordinal	Survey
Gender	Nominal	Survey
Ethnicity	Nominal	Survey
Healthcare provider type	Nominal	Survey
Practice site	Nominal	Survey
Years of practice	Ordinal	Survey
Evaluation of CVD risk	Ordinal (Likert type scale)	Survey
Lifestyle recommendations	Ordinal (Likert type scale)	Survey
High risk CVD	Nominal	Survey
At risk CVD	Nominal	Survey
Ideal CVD health	Nominal	Survey
Effectiveness of helping patient	Ordinal (Likert type scale)	Survey
Patient adherence tracking system	Nominal	Survey
Evidence-based guidelines awareness	Nominal	Survey
Barriers to CVD prevention	Ordinal (Likert type scale)	Survey
Clinical guidelines resources/frequency	Ordinal	Survey
Knowledge scenarios	Ordinal	Survey

## Appendix I

## Clinical Project Questions, Survey Questions, and Statistic Test used

Clinical Project Question	Survey questions	Statistical Test Used
Is there a difference in knowledge of women and heart disease between primary care, cardiology, and OB/GYN practices?	Factors that place a woman at high risk for CVD (7 items). Question 11	Descriptive
	Factors that place a woman at risk for CVD (14 items). Question 12	Descriptive
	Factors that denote ideal cardiovascular health for women (10 items). Question 13	Descriptive
	Aware of the evidence-based guidelines for the treatment and prevention of CVD in women Case scenarios (2). Questions 20, 21	Descriptive
What are the barriers affecting the provision of CVD risk factor therapies in women?	Several statements made by healthcare professionals regarding CVD prevention in women (11 items). Question 17	Descriptive
	Barriers to utilization of evidence-based clinical guidelines (5 items). Question 18	Descriptive
Is there a difference in the practice of women and heart disease between primary care, cardiology, and OB/GYN practices?	Initial evaluation for CVD risk for CVD (8 items). Question 7	Cross-tabulation
	Initial evaluation for CVD, physical exam (3 items). Question 8 Depression screen. Question 9 Lifestyle recommendations. Question 10	

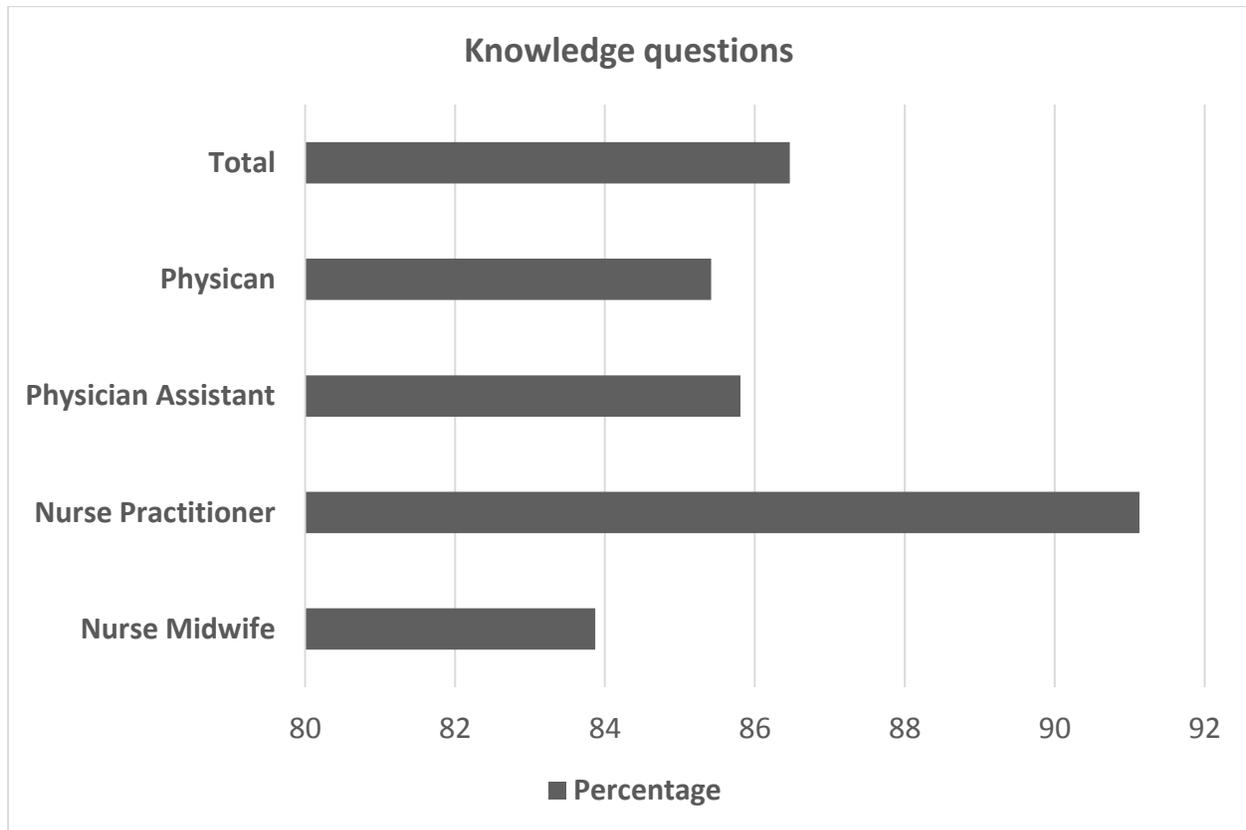
Clinical Project Question	Survey questions	Statistical Test Used
	System in place for tracking patient adherence	
	Question 15	
	Resources used for locating the most current clinical guidelines (13 items)	

## Appendix J

Table 1. *Respondent Characteristics*

Demographics	<i>n</i>	%
Gender		
Female	25	61
Male	16	39
Race/Ethnicity		
Asian	5	12.2
Black/African-American	1	2.4
Hispanic/Latino	1	2.4
Native American	0	0
Pacific Islander	0	0
White/Caucasian	32	78
Other	2	4.9
Title		
Nurse Midwife	3	7.3
Nurse Practitioner	8	19.5
Physician Assistant	5	12.2
Physician	25	61
Practice site		
Cardiology	14	34.1
Family Practice	12	29.3
Internal Medicine	5	12.2
OB/GYN	7	17.1
Other	3	7.3
	mean	SD
Clinical practice in years	17.18	13.24
Age in years	48.44	12.73

## Appendix K



*Figure 1.* Total knowledge choices- 42, total correct choices- 31

Question 11: Which factors places a woman at high risk for CVD? Select all that apply.

Question 12: Which factors places a woman at risk for CVD? Select all that apply.

Question 13: Which factors denote ideal cardiovascular health? Select all that apply.

Question 16: Are you aware of the evidence-based guidelines published by the AHA for the treatment and prevention of CVD in women?

Question 20 and 21: In the following scenario, please provide how you would manage these patients in your clinical practice based on the latest 2011 Guidelines for the Prevention of Cardiovascular Disease in Women. Select all that apply.

Table 1

*Knowledge Questions and Percentage Correct*

Knowledge percentage correct by title

Role	%	n	SD
Nurse Midwife	83.871	3	6.4516
Nurse Practitioner	91.129	8	6.3937
Physician Assistant	85.806	5	13.0236
Physician	85.419	25	9.5020
Total	86.467	41	9.2716

Question 11: Which factors places a woman at high risk for CVD? Select all that apply.

Question 12: Which factors places a woman at risk for CVD? Select all that apply.

Question 13: Which factors denote ideal cardiovascular health? Select all that apply.

Question 16: Are you aware of the evidence-based guidelines published by the AHA for the treatment and prevention of CVD in women?

Question 20 and 21: In the following scenario, please provide how you would manage these patients in your clinical practice based on the latest 2011 Guidelines for the Prevention of Cardiovascular Disease in Women. Select all that apply.

Table 2.

*Statements from Healthcare Providers Regarding CVD Prevention in Women*

Statements <sup>a</sup>	<i>n</i> <sup>b</sup>	%
More primary prevention should be done with patients; however the time constraints of a "typical" patient visit does not allow it	36	90
If insurance companies provided better coverage for lifestyle interventions (i.e. weight loss and smoking cessation), I would spend more time doing it	28	70
My greatest barrier to prevention of heart disease is the patient themselves	28	70
Many clinical guidelines, although ideal, are impractical for the staff myself to implement	17	43
I am more likely to adopt treatment guidelines into my practice that are published by professionals within my specialty	30	75
Multiple treatment guidelines, each with somewhat different recommendations, makes it difficult to determine which is the best to use with my patient	33	83
More women than men die each year from CVD	26	65
I am willing to seek additional training that allows me to better engage in preventative health treatments for CVD in women	38	95
Counseling patients on preventative treatment who are not willing to take control of their health is largely ineffective	29	73
Depression in CVD patients is common and goes undiagnosed	40	100
My clinical judgment is usually more effective than clinical guidelines in improving health outcomes in my patients	12	30

<sup>a</sup> Agree/strongly agree

<sup>b</sup>*n* = 40

Question 17- Statements that some healthcare professionals have made regarding CVD prevention in women. Indicate how much you agree or disagree with each statement.

Table 3.

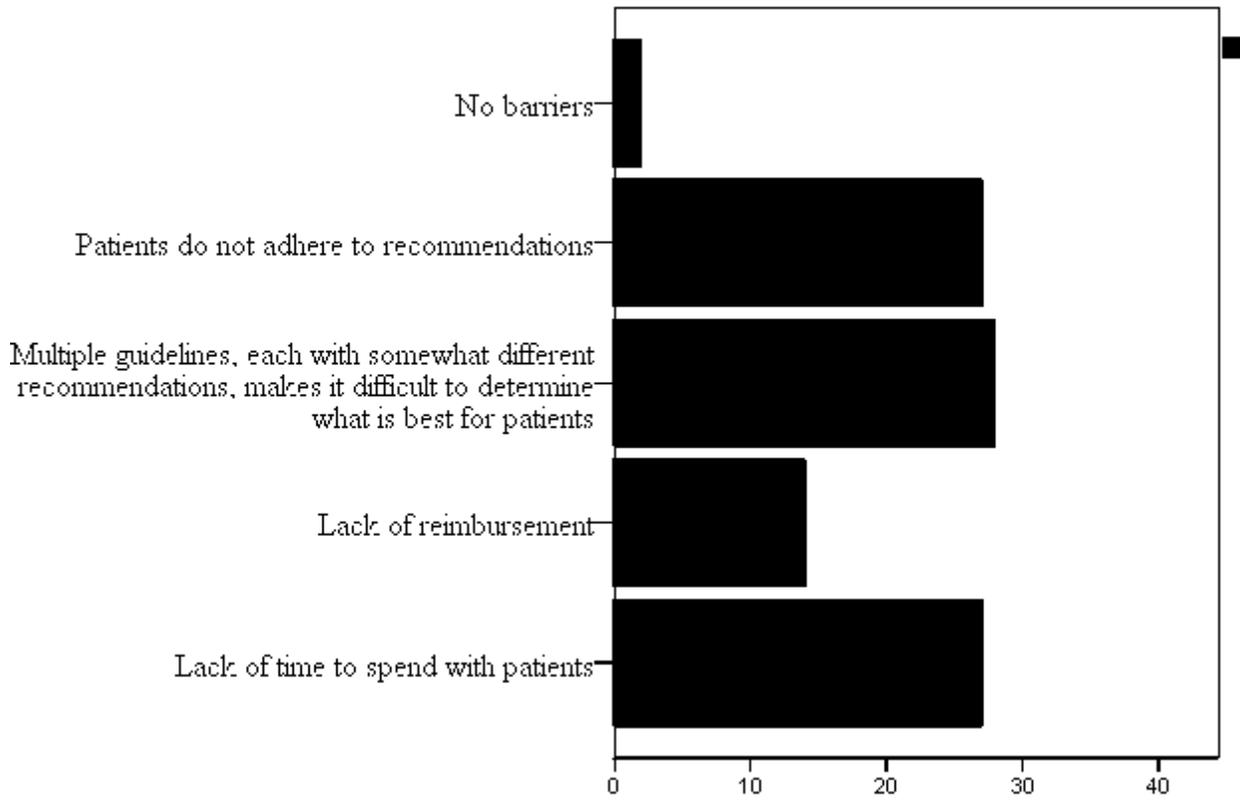
*Effective in Helping Women Patients Statements*

Statement	<i>n</i> <sup>a</sup>	%
Understand the risk of heart disease	37	93
Manage their weight	24	60
Stop smoking	27	67
Maintain an adequate level of physical activity	23	58
Eat a "heart healthy" diet	25	63
Lower their LDL cholesterol	31	77
Increase their HDL cholesterol	23	58
Keep their BP at 120/80 or better	35	87
Prevent a heart attack	25	63
Take medications as prescribed	35	88

<sup>a</sup>*n* = 40

Question 14. How effective do you feel you can be in helping women patients? The possible choices were- not very effective, slightly effective, effective, and very effective.

**Barriers to Utilization of Evidence-Based Guidelines**



*Figure 2.* Barriers to utilization of evidence-based guidelines

Question 18. What are your barriers to the utilization of evidence-based clinical guidelines?  
 Select all that apply.

Table 4

*Initial Evaluation for CVD in Women*

	<i>n</i> (%)
Medical History <sup>1</sup>	41 (100)
Family History <sup>1</sup>	41 (100)
Pregnancy Complication History <sup>1</sup>	20 (49)
Fasting Lipid Profile <sup>1</sup>	37 (90)
Fasting Glucose <sup>2</sup>	30 (75)
Coronary Artery Calcium Score <sup>2</sup>	1 (2)
Framingham Risk Assessment <sup>2</sup>	13 (32)
ASCVD Risk Estimator® <sup>2</sup>	18 (45)

<sup>1-</sup> *n*=41

<sup>2-</sup> *n*=40

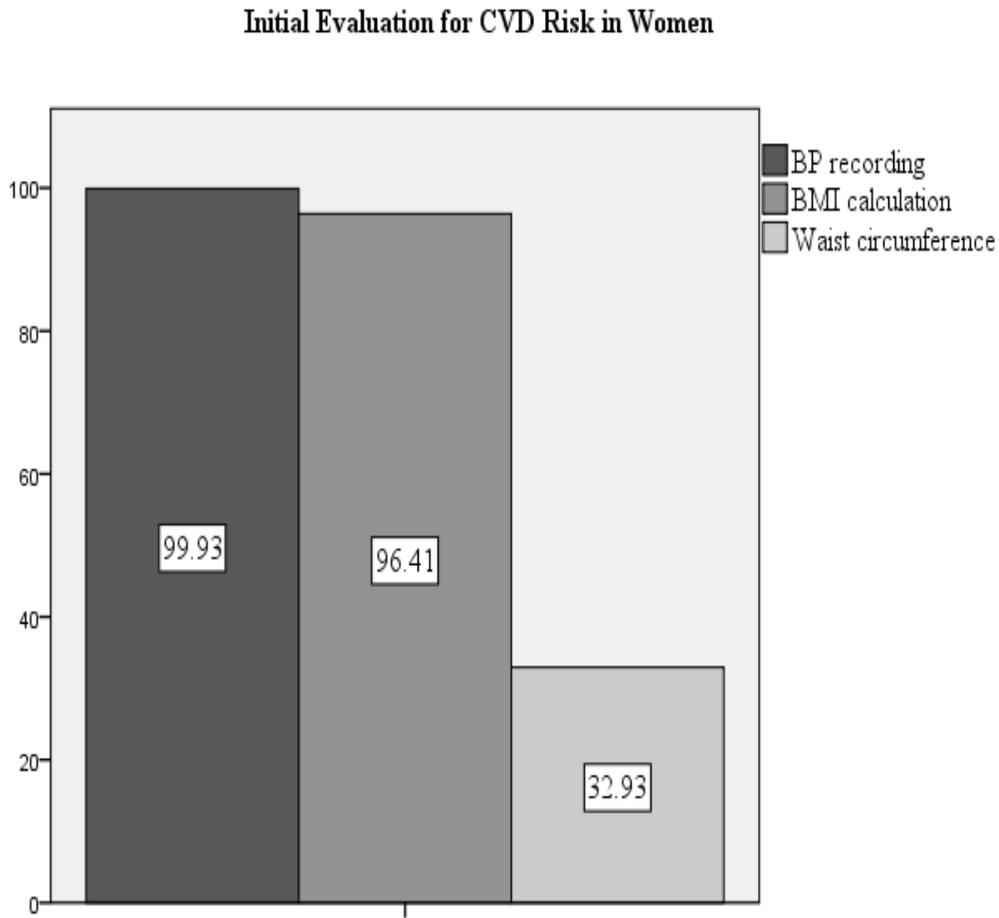
Question 7. In your initial evaluation for CVD risk in women, how often do you obtain? Never, rarely, most of the time, all of the time.

Table 5.

*Initial Evaluation for CVD Risk in Women by Practice Site*

	Cardiology		Family Practice		Internal Medicine		OB/GYN		Other	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Initial exam										
Medical history	14	100	12	100	5	100	7	100	3	100
Family history	14	100	12	100	5	100	7	100	3	100
Pregnancy complication history	14	50	12	42	5	40	7	86	3	0
Fasting lipid profile	14	93	12	100	5	100	7	57	3	100
Fasting glucose	14	79	12	92	5	80	6	33	3	67
Coronary artery calcium score	14	7	12	0	5	0	6	0	3	0
Framingham risk assessment	14	57	12	33	5	20	6	0	3	0
ASCVD Risk Estimator®	14	79	12	42	5	40	6	0	3	0

Question 7. In your initial evaluation for CVD risk in women, how often do you obtain? Never, rarely, most of the time, all of the time.



*Figure 3: Initial Evaluation for CVD/Physical Exam*

Question 8. In your initial evaluation for CVD risk in women, does your physical exam include?

Table 6.

*Initial CVD Evaluation/Physical Exam of Women by Practice Site*

	Cardiology		Family Practice		Internal Medicine		OB/GYN		Other	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
BP recording	14	100	12	99.75	5	100	7	100	3	100
BMI calculation	14	100	12	95.3	5	100	7	100	3	70
Waist circumference	14	49.4	12	25.4	5	40.4	7	6.4	3	35.3

Question 8. In your initial evaluation for CVD risk in women, does your physical exam include?

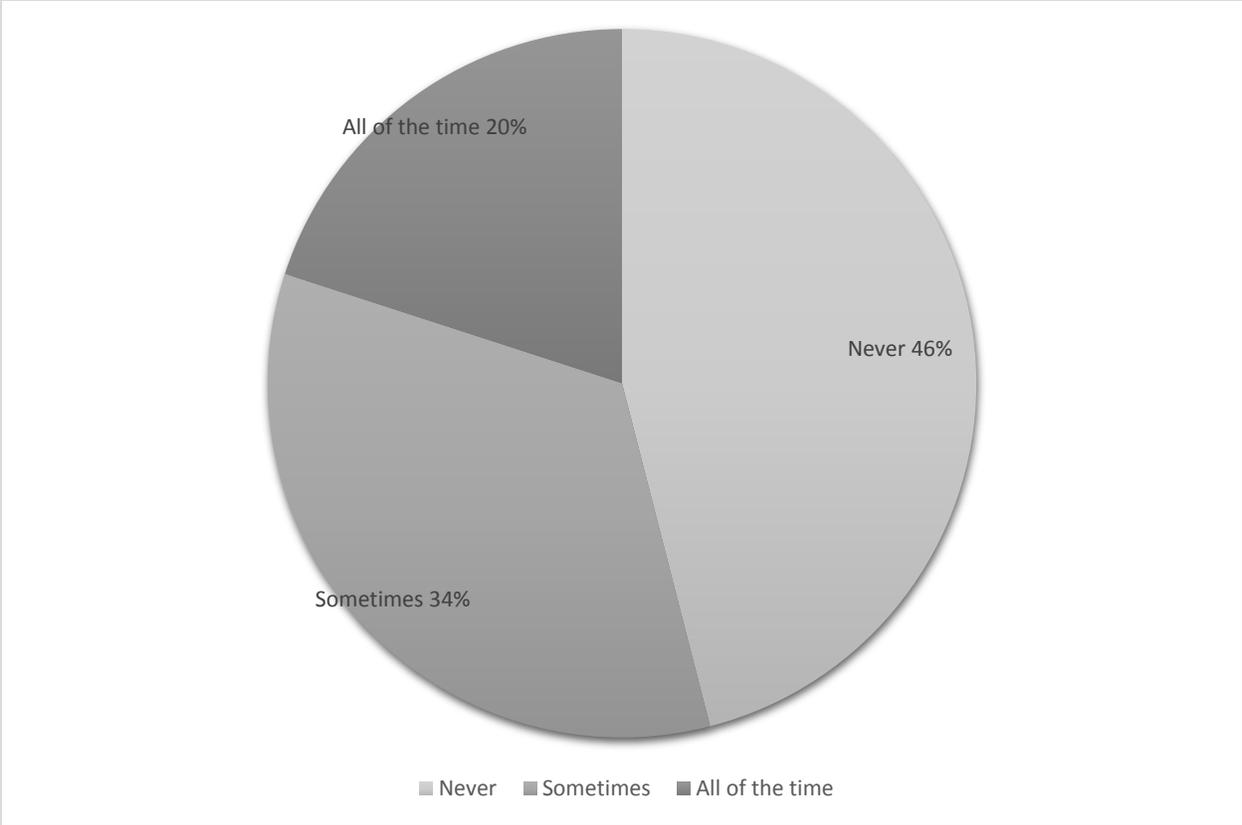


Figure 4. Depression Screening

Question 9. How often do you administer a depression-screening tool in women?  
Responses ranged from 0 (never) to 10 (all of the time).  
All of the total responses were divided into three groups for clarity: all of the time (7, 8, 9, 10),  
sometimes (4, 5, 6), and never (0, 1, 2, 3).

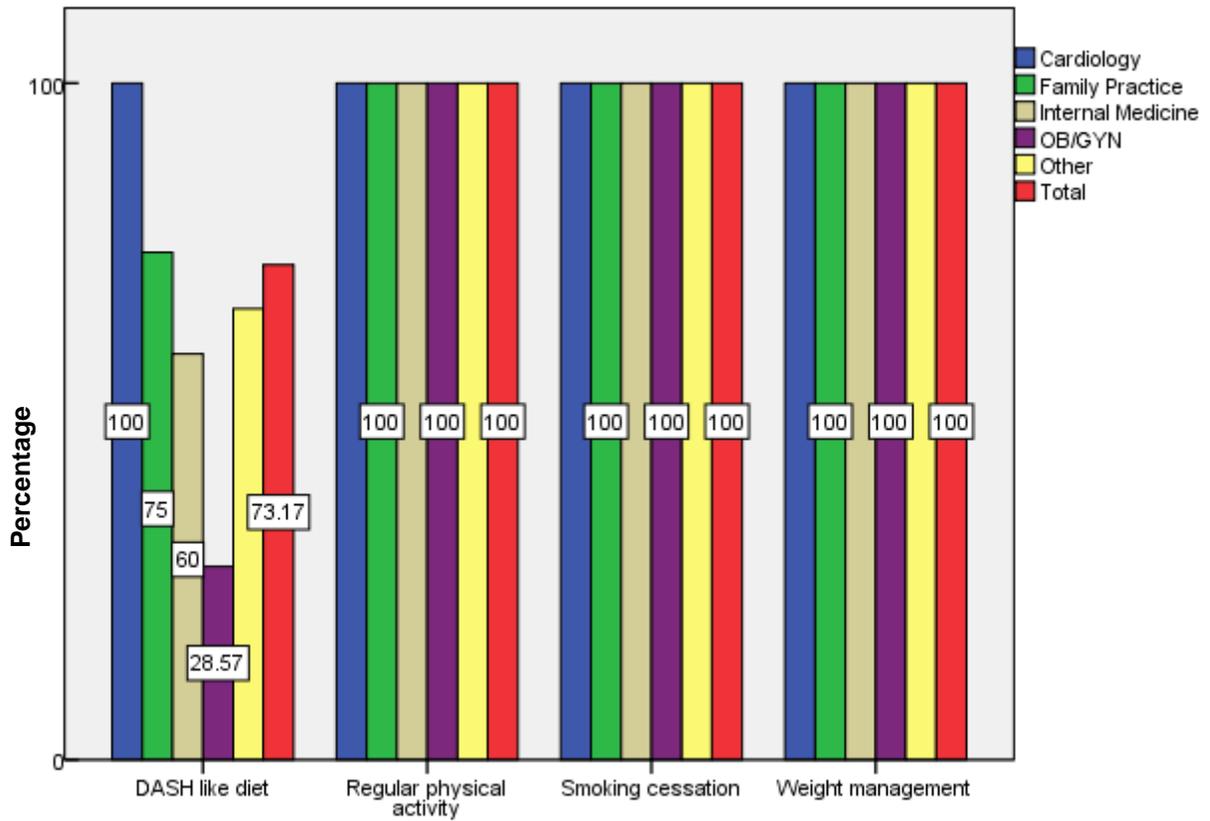


Figure 5. Lifestyle recommendations percentages

Question 10. How often do you recommend the following lifestyle recommendations?

All of the time, most of the time, rarely, never

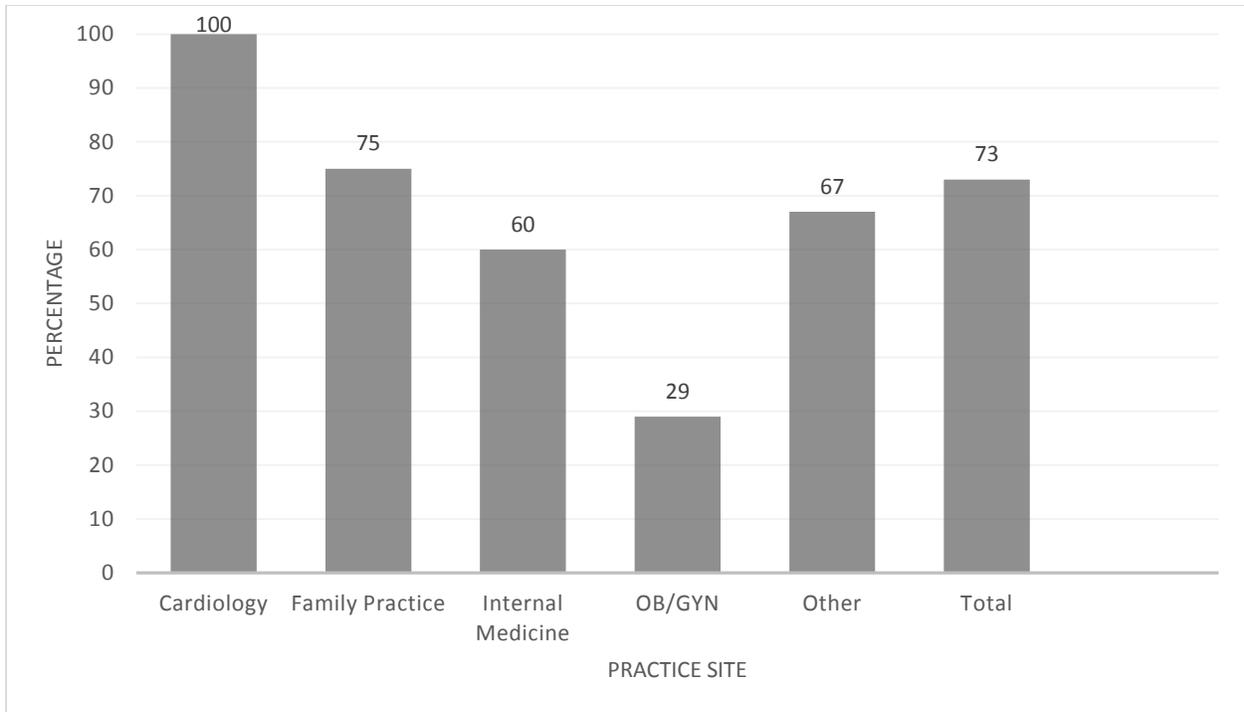
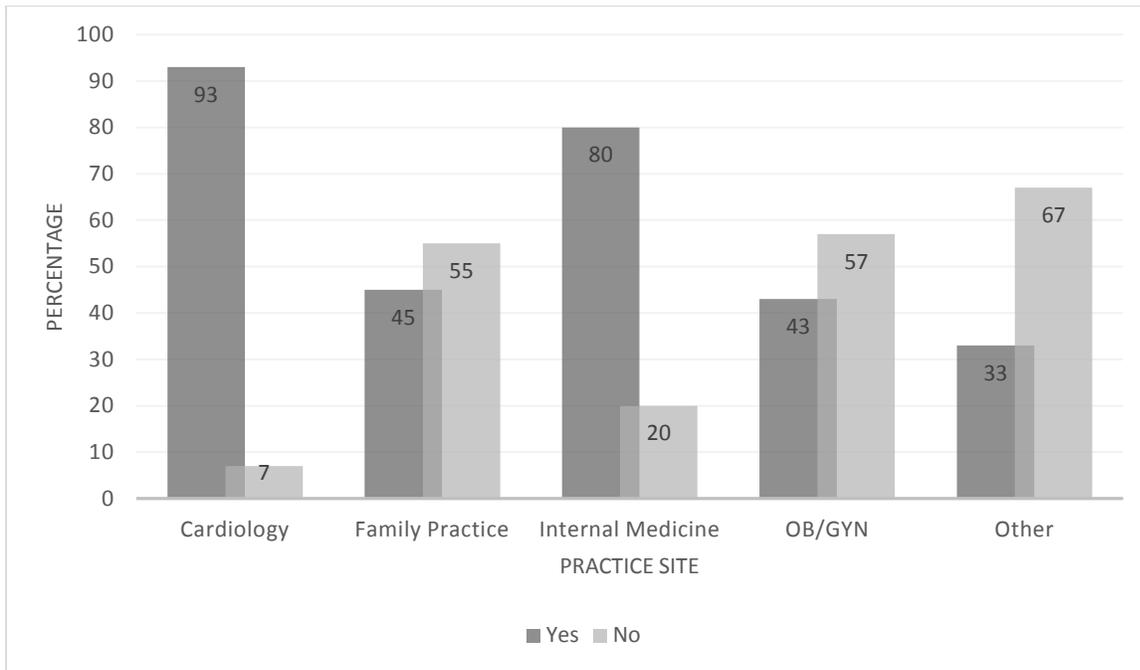


Figure 6. DASH-like diet recommendation by practice site

Question 10. How often do you recommend the following lifestyle recommendation?  
All of the time, most of the time, rarely, never



*Figure 7.* Awareness of the evidence-based guidelines published by the American Heart Association (AHA) for the treatment and prevention of CVD in women.

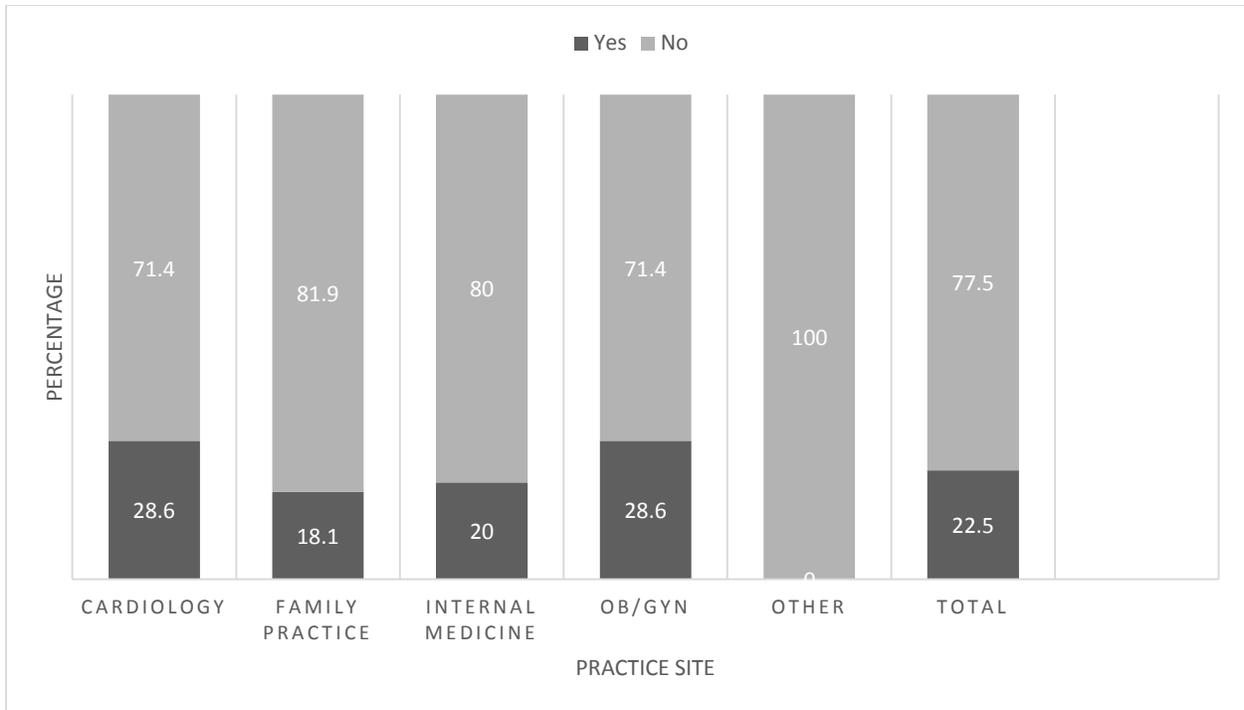
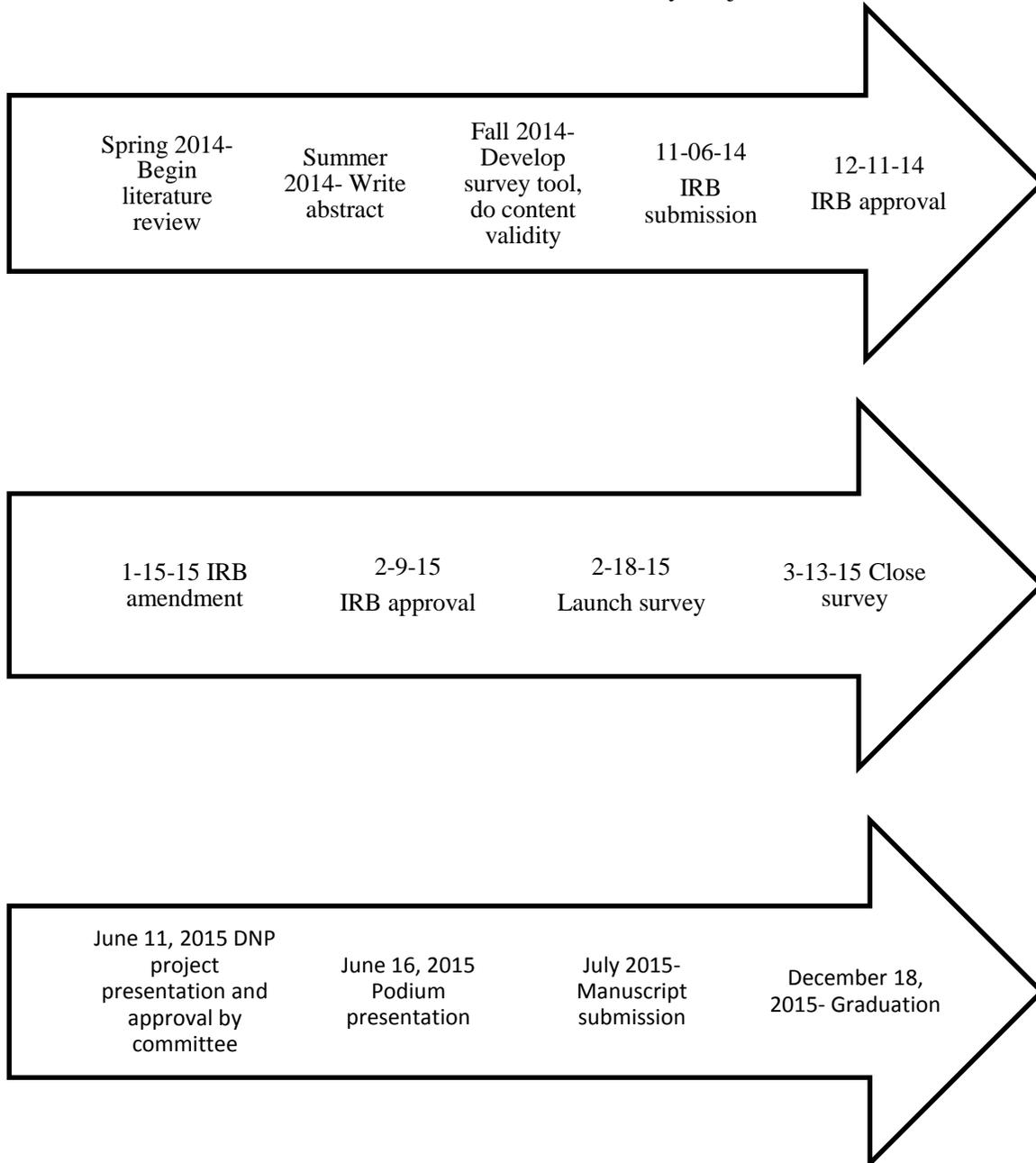


Figure 8. Practice site percentages of system in place for tracking lifestyle changes

Question 15. Do you have a system in place for tracking patient adherence to your recommended lifestyle changes; i.e. diet, exercise, smoking cessation?

Appendix L

Timeline of DNP Scholarly Project



## Appendix M

**EAST CAROLINA UNIVERSITY**  
**University & Medical Center Institutional Review Board Office**  
 4N-70 Brody Medical Sciences Building· Mail Stop 682  
 600 Moye Boulevard · Greenville, NC 27834  
 Office **252-744-2914** · Fax **252-744-2284** · [www.ecu.edu/irb](http://www.ecu.edu/irb)

## Notification of Initial Approval: Expedited

From: Biomedical IRB  
 To: [Helene Reilly](#)  
 CC: [Robin Webb Corbett](#)  
 Date: 12/11/2014  
 Re: [UMCIRB 14-001595](#)  
 Women and Heart Disease

I am pleased to inform you that your Expedited Application was approved. Approval of the study and any consent form(s) is for the period of 12/10/2014 to 12/9/2015. The research study is eligible for review under expedited category #7. The Chairperson (or designee) deemed this study no more than minimal risk.

Changes to this approved research may not be initiated without UMCIRB review except when necessary to eliminate an apparent immediate hazard to the participant. All unanticipated problems involving risks to participants and others must be promptly reported to the UMCIRB. The investigator must submit a continuing review/closure application to the UMCIRB prior to the date of study expiration. The Investigator must adhere to all reporting requirements for this study.

Approved consent documents with the IRB approval date stamped on the document should be used to consent participants (consent documents with the IRB approval date stamp are found under the Documents tab in the study workspace).

The approval includes the following items:

Name	Description
CONSENT FORM	Consent Forms
HEALTHCARE PROVIDER AWARENESS AND KNOWLEDGE OF WOMEN AND HEART DISEASE	Surveys and Questionnaires
Scholarly Practicum Proposal	Study Protocol or Grant

Application

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

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IRB00000705 East Carolina U IRB #1 (Biomedical) IORG0000418

IRB00003781 East Carolina U IRB #2 (Behavioral/SS) IORG0000418

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 Office **252-744-2914** · Fax **252-744-2284** · [www.ecu.edu/irb](http://www.ecu.edu/irb)

Notification of Amendment Approval

From: Biomedical IRB  
 To: [Helene Reilly](#)  
 CC: [Robin Webb Corbett](#)  
 Date: 2/9/2015  
 Re: [Ame1 UMCIRB 14-001595](#)  
[UMCIRB 14-001595](#)  
 Women and Heart Disease

Your Amendment has been reviewed and approved using expedited review for the period of 2/9/2015 to 12/9/2015. It was the determination of the UMCIRB Chairperson (or designee) that this revision does not impact the overall risk/benefit ratio of the study and is appropriate for the population and procedures proposed.

Please note that any further changes to this approved research may not be initiated without UMCIRB review except when necessary to eliminate an apparent immediate hazard to the participant. All unanticipated problems involving risks to participants and others must be promptly reported to the UMCIRB. A continuing or final review must be submitted to the UMCIRB prior to the date of study expiration. The investigator must adhere to all reporting requirements for this study.

Approved consent documents with the IRB approval date stamped on the document should be used to consent participants (consent documents with the IRB approval date stamp are found under the Documents tab in the study workspace).

The approval includes the following items:

Document	Description
Email cover letter(0.01)	Recruitment Documents/Scripts
HEALTHCARE PROVIDER AWARENESS AND KNOWLEDGE OF WOMEN AND HEART DISEASE(0.08)	Surveys and Questionnaires

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

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IRB00000705 East Carolina U IRB #1 (Biomedical) IORG0000418  
IRB00003781 East Carolina U IRB #2 (Behavioral/SS) IORG0000418

**Reilly, Helene**

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**From:** Karen Robb <Karen.Robb@heart.org>  
**Sent:** Wednesday, September 03, 2014 10:37 AM  
**To:** Reilly, Helene  
**Subject:** RE: Women and Heart Disease  
**Attachments:** AHA Draft\_FINAL\_FINAL\_HCP Preventive Study.DOC

Hi Helene,

Thanks for your follow-up. So sorry for the delay. As Dr. Mosca has indicated, please feel free to use the attached. If you are so inclined, we would appreciate any results you are willing to share. You may send them back to me.

Best,  
Karen

Karen Robb

Manager, Customer and Marketing Research  
**American Heart Association/American Stroke Association**  
Office: 214-706-1409, [karen.robb@heart.org](mailto:karen.robb@heart.org)

**From:** Reilly, Helene [mailto:REILLYH@ecu.edu]  
**Sent:** Wednesday, September 03, 2014 9:33 AM  
**To:** Karen Robb  
**Subject:** RE: Women and Heart Disease

Hello Karen

Dr. Mosca has given me your name as a contact. Please read below.

Thank you

*Helene*

**Helene E. Reilly, MSN, FNP-BC**  
Family Nurse Practitioner  
Department of Cardiovascular Sciences  
East Carolina Heart Institute @East Carolina University  
Room 1350  
115 Heart Drive  
Greenville, NC 27834

252 744-0771  
252 744-7602 (fax)  
383-3137 (pager)  
e-mail [reillyh@ecu.edu](mailto:reillyh@ecu.edu)



EAST CAROLINA  
HEART INSTITUTE

**From:** Mosca, Lori [mailto:[ljm10@cumc.columbia.edu](mailto:ljm10@cumc.columbia.edu)]  
**Sent:** Thursday, August 28, 2014 9:51 AM  
**To:** Reilly, Helene  
**Cc:** Karen Robb; Rehm, Lisa M.  
**Subject:** RE: Women and Heart Disease

Helene,  
AHA can help you get the tools you need. Most of our survey questions are available in an online supplement. They have been used by many doctoral students and countries around the world. Feel free to use for your work. Karen Robb from AHA will contact you to assist you. Best to you. Lori

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**From:** Reilly, Helene [mailto:[REILLYH@ecu.edu](mailto:REILLYH@ecu.edu)]  
**Sent:** Wednesday, August 27, 2014 11:08 PM  
**To:** [ljm10@columbia.edu](mailto:ljm10@columbia.edu)  
**Subject:** Women and Heart Disease

Dear Dr. Mosca

I am currently pursuing my doctorate in nursing practice at East Carolina University (Greenville, NC). I am currently a nurse practitioner practicing in the cardiovascular clinic as noted below.

I have practiced in Cardiology all my career (several decades) and have always had an interest in Women and Heart Disease. Not only do I manage these patients, I have also given several presentations on the topic.

I am in a unique and opportune time to make a difference in my practice (and others, hopefully). I have read the Guidelines for the Prevention of CVD in Women and followed the evolution since 1997. It has motivated me more to become more involved. The issue that has my attention now is the provider awareness of the incidence of women and heart disease. Even though we have made some strides from 30 to 56% in women's knowledge and perception of heart disease, I feel we have a long way to go. I believe this number could improve if providers increased their knowledge, awareness, and treatment of women across the life span.

In my literature search I found very little published on provider knowledge and treatment of heart disease in women since your paper in 2005, "National study of physician awareness and adherence to cardiovascular disease prevention guidelines." I would like to ask your permission to either use your survey tool or tailor some of the questions in my scholarly project. My intention is to survey my own Cardiology practice providers, including physicians and nurse practitioners. In addition, I would like to compare the answers to providers in OB/Gyn practices and family practices.

Thank you in advance for any support, insight, or guidance you can provide. I have read a fair amount of your papers and have a lot of respect for your expertise.

**Helene E. Reilly, MSN, FNP-BC**

*Family Nurse Practitioner*

*Department of Cardiovascular Sciences*

*East Carolina Heart Institute @East Carolina University*

*Room 1350  
115 Heart Drive  
Greenville, NC 27834*

*252 744-0771*

From:

07/13/2015 07:16 #250 P.002/002

<https://www.piratemail.ecu.edu/owa/WebReadyViewBody.aspx?i=att...>

Student Name: Helene E. Reilly  
Project Title: Women and Heart Disease: Knowledge Differences between  
Primary Care and Specialty  
Practices

Private Defense Completed on June 11,  
2015

Public Defense Completed on June 16,  
2015

**Final Project/Final Paper Approval:**

As the Chair of this student's Doctor of Nursing Practice Scholarly Project Committee, I have reviewed and approved this student's project and final paper and agree that he/she has met the project expectations, including the DNP Essentials, and has completed the project.

DNP Committee Chair

Signature: Robin Kelly Collett, PhD Date July 10, 2015

