THE ACUTE CORONARY SYNDROME EXPERIENCE AMONG NATIVE AMERICAN ADULTS IN NORTHERN ARIZONA

by

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Final approval and acceptance of this DNP Project is contingent upon the candidate’s submission of the final copies of the DNP Project to the Graduate College.

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________________________
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DEDICATION

To the individuals and families whose lives were affected by heart disease...
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ABSTRACT

Diseases of the heart have been the number one cause of death in the Native American population for decades and is an adverse health disparity for this population. Heart disease mortality rates are higher in Native Americans than in the U.S. population (American Heart Association, 2015; Veazie et al., 2014). The purpose of this Doctor of Nursing Practice (DNP) project is to describe the acute coronary syndrome (ACS) experience among Native American adults who reside in northern Arizona and diagnosed with an acute myocardial infarction.

A qualitative dominant mixed methods design (QUAL→quan) was used to describe the ACS symptom experience among this population. Data was collected from a convenience sample of nine Native American men residing on the Navajo and Hopi reservations in northern Arizona diagnosed with an acute myocardial infarction. The qualitative portion of this study consisted of a semi-structured interview and the quantitative portion consisted of the completion of a demographic questionnaire and the McSweeney Acute and Prodromal Myocardial Infarction Symptom Survey. Qualitative description were used to analyze the data and develop codes, subcategories, categories and themes. Descriptive statistics were used to analyze the data from the demographic questionnaire and MAPMISS results.

The findings in this study revealed the average age of the first heart attack for these participants was 58 years. The average time from symptom onset to hospital presentation was 7.4 hours. A common prodromal symptom was very tired/unusual fatigue. Common acute symptoms were chest pain, shortness of breath, gastrointestinal symptoms and diaphoresis. Neck/throat, generalized chest, and top of shoulders were most frequently reported areas of acute pain or discomfort. Influences to not seeking treatment included ignoring symptoms or thinking
symptoms would go away. Influences to seeking treatment included worsening or non-resolution of symptoms. Accessing health care was difficult for almost all participants and contributed to treatment delay. Findings from this study gave new insight on ACS symptoms and the ACS experience of Native American men, reinforced current knowledge of the health disparities that exist in this population, and will assist in the development of culturally-sensitive, community-based education programs directed toward the Native American population.
CHAPTER ONE: INTRODUCTION

The purpose of this DNP project was to describe the acute coronary syndrome (ACS) experience among Native American adults who reside in northern Arizona and were diagnosed with an acute myocardial infarction (AMI). What do we know about ACS symptoms in the Native American population? Very few studies have examined ACS symptoms among Native Americans, thus identifying a knowledge gap of ACS symptoms in the Native American population. The results of this study will assist health care professionals in identifying potential barriers to seeking prompt treatment for symptoms of ACS and developing a culturally-sensitive, community-based education program directed toward the Native American population to increase awareness of ACS symptoms. Working as an emergency department nurse in a rural area of the Navajo Nation, I was concerned to see Native American patients present to the emergency department days after their chest pain symptoms began. Delayed presentation for ACS results in lack of oxygenated blood to myocardial tissue (myocardial ischemia), resulting in myocardial tissue necrosis (O’Gara et al., 2013). These long ischemic times not only limit treatment options but also result in greater myocardial damage and increased morbidity and mortality (De Luca et al., 2003; Denktas, Anderson, McCarthy, & Smalling, 2011; Fibrinolytic Therapy Trialists Collaborative Group, 1994; Newby et al., 1996). This chapter presents the background, statement of the problem, purpose of the study, research questions, and significance to nursing.

Background

ACS is associated with atherosclerotic plaque rupture resulting in partial or complete thrombosis of the infarct-related coronary artery and refers to unstable angina, myocardial
infarction without ST-elevation, and myocardial infarction with ST-elevation (Amsterdam et al., 2014; Hamm et al., 2011). An ST-elevation is defined as a new ST-elevation of $\geq 2$ mm in men or $\geq 1.5$ mm in women in at least two contiguous leads of V2-V3 and/or of $\geq 1$ mm in other contiguous precordial or limb leads (O’Gara et al., 2013). The development of a myocardial infarction begins with the initial onset of myocardial ischemia, which comes from an imbalance of oxygen supply and demand (Thygesen et al., 2012). A myocardial infarction occurs as a result of prolonged ischemia, with the end result being myocardial cell death. Symptoms indicating myocardial ischemia include diffuse discomfort in chest, upper extremities, jaw, or epigastic region; dyspnea; or fatigue, can occur with exertion or at rest and can occur days, weeks or months prior to the AMI (prodromal symptoms; Thygesen et al., 2012). Symptoms of an AMI include diffuse discomfort lasting more than 20 minutes, nausea, and diaphoresis, which are not dependent on movement or respirations (Thygesen et al., 2012). It is important to know that AMI symptoms can also occur as atypical symptoms, and vary widely from one individual to the next.

Knowing the different subcategories of ACS helps with understanding why patients suffering from ACS need to seek attention promptly. The three subcategories of ACS, which are unstable angina, non-ST-elevation myocardial infarction, and ST-elevation myocardial infarction are discussed in the following sections.

**Unstable Angina and Non-ST-Elevation Myocardial Infarction**

Two subcategories of ACS are unstable angina (UA) and non-ST-elevation myocardial infarction (NSTEMI). UA and NSTEMI are caused by atherosclerotic coronary artery disease and both carry a risk of cardiac death (Amsterdam et al., 2014; Hamm et al., 2011). In UA and NSTEMI, a disrupted atherosclerotic plaque progresses into a non-occlusive thrombus, causing a
narrowing of the coronary artery, decreased myocardial perfusion, and can present as a transient or persistent ST-segment depression or T-wave inversion, flattened T-waves, pseudonormalization of T-waves, or no changes on electrocardiogram (Amsterdam et al., 2014; Hamm et al., 2011). UA causes ST-T-wave abnormalities and undetermined or normal electrocardiogram findings with normal troponins. Troponins are specific and sensitive cardiac biomarkers of myocardial cell injury and are released in response to myocardial injury (Amsterdam et al., 2014; Wolfe Barry, Barth, & Howell, 2008). Cardiac troponins are more cardiac-specific than creatine kinase or creatine kinase MB, having a high sensitivity that detects microscopic areas of myocardial necrosis (Wolfe Barry et al., 2008). NSTEMI causes ST-T-wave abnormalities, undetermined or normal electrocardiographic findings with a rise or fall in troponins (Amsterdam et al., 2014; Hamm et al., 2011). Patients with the chief complaints of intermittent/persistent chest pressure or heaviness radiating to left arm, neck, or jaw; severe epigastric pain (non-traumatic in origin); dyspnea; nausea and/or vomiting; syncope; or diaphoresis must immediately get an electrocardiogram, ideally within 10 minutes of time of presentation (Amsterdam et al., 2014; Hamm et al., 2011). Thrombolytic reperfusion therapy is not an option for these patients. Instead they should receive anti-ischemic therapy or catheter-based therapy, according to American College of Cardiology Foundation/ American Heart Association (ACCF/AHA) guidelines (Amsterdam et al., 2014; Hamm et al., 2011).

**ST-Elevation Myocardial Infarction**

ST-elevation myocardial infarction (STEMI) causes myocardial ischemic symptoms in conjunction with persistent ST-elevation seen on electrocardiogram along with presence of cardiac biomarkers (preferably troponin) signifying myocardial necrosis, subsequently resulting
in an AMI (O’Gara et al., 2013). The Joint Task Force, consisting of the European Society of Cardiology (ESC), ACCF, AHA, and World Heart Federation (WHF), defined the criteria for myocardial infarction as the presence of a rise or fall of cardiac biomarkers (preferably troponin), with the value being greater than the 99th percentile upper reference limit, along with one of the following: ischemic symptoms, new or presumed new significant ST-segment-T-wave changes or a new left bundle branch block, pathologic Q wave development, new loss of myocardium or regional wall motion abnormality, or an intracoronary thrombus identification (O’Gara et al., 2013; Steg et al., 2012; Thygesen et al., 2012). ST-elevation in STEMI is defined as “new ST-elevation at the J point in at least two contiguous leads of ≥ 2 mm (0.2 mV) in men or ≥ 1.5 mm (0.15 mV) in women in leads V2-V3 and/or of ≥ 1 mm (0.1 mV) in other contiguous precordial leads or limb leads” (O’Gara et al., 2013, p. e367). The Joint Task Force also provided specific criteria for myocardial infarction related to percutaneous coronary intervention (PCI), stent thrombosis, and coronary artery bypass grafting (O’Gara et al., 2013; Steg et al., 2012; Thygesen et al., 2012). Patients with suspected STEMI should get an electrocardiogram within 10 minutes of arrival at a hospital, be maintained on continuous electrocardiogram monitoring, and have blood drawn for cardiac biomarkers (O’Gara et al., 2013; Steg et al., 2012; Thygesen et al., 2012). According to the ESC/ACCF/AHA/WHF guidelines, the goal for these patients depends on whether the initial presentation is to a percutaneous intervention (PCI) capable or non-PCI-capable hospital (O’Gara et al., 2013; Steg et al., 2012; Thygesen et al., 2012). If a patient is initially seen at a PCI-capable hospital, the first medical contact-to-device time should be less than or equal to 90 minutes (O’Gara et al., 2013; Steg et al., 2012; Thygesen et al., 2012). If the initial presentation is to a non-PCI-capable hospital, transport to a PCI-capable hospital is
recommended if first medical contact-to-device time can be accomplished in less than or equal to 120 minutes (O’Gara et al., 2013; Steg et al., 2012; Thygesen et al., 2012). If this cannot be accomplished within 120 minutes, guidelines recommend the administration of fibrinolytic therapy within 30 minutes of arrival, then urgent transfer for a PCI if there is evidence of reperfusion failure/reocclusion, or transfer for angiography and revascularization within 3-24 hours for other patients as part of an invasive strategy (O’Gara et al., 2013; Steg et al., 2012; Thygesen et al., 2012). Early evaluation is critically important in identifying individuals who may be having an ST-elevation myocardial infarction so they can be considered for immediate reperfusion therapy, whether it is through a fibrinolytic, PCI, or coronary artery bypass (O’Gara et al., 2013; Steg et al., 2012; Thygesen et al., 2012).

The Native American Population

Over 25% of the geographic area of Arizona is made up of reservations and tribal communities of 21 federally recognized tribes (Center for Rural Health [CRH], 2012). This project inquiry focuses on Native American adults who are Navajo or Hopi, living in northern Arizona, and on or near the Navajo and Hopi reservations. The largest reservation in the southwestern United States is the Navajo reservation, which covers approximately 27,000 square miles. This vast reservation spans across all of northeastern Arizona, the southeastern portion of Utah, and northwestern New Mexico (CRH, 2012), and is approximately the size of West Virginia (Indian Health Service [IHS], n.d.). The 2010 U.S. Census reported 332,129 Navajo people living throughout the United States, of which 140,263 were in Arizona (United States Census Bureau, 2010). The Hopi reservation is located in northeastern Arizona, within the borders of the Navajo reservation (Hopi Tribe, 2013). Twelve Hopi villages on three mesas
comprise this reservation that lies on approximately 3,500 square miles (Hopi Tribe, 2013). There are 18,327 Hopi people living in the United States, with approximately 10,000 living within Arizona borders (United States Census Bureau, 2010). The U. S. Census (2010) also reported the American Indian/Alaskan Native (AIAN) population totaled over 5.2 million in the United States, with over 353,000 living in Arizona. The Native American tribes frequently encountered in northern Arizona are the Navajo and Hopi. Members of these tribes are the focus in this study.

The IHS provides medical and public health services to Native Americans throughout the United States (IHS, n.d.). The Navajo Area Indian Health Service (NAIHS) provides medical and public health services to over 200,000 Native Americans on or near reservations at six hospitals, seven health centers and 15 health stations in parts of Arizona, New Mexico, and Utah, and is part of the IHS (IHS, n.d.). NAIHS hospitals range from 32 beds at Crownpoint Health Care Facility in Crownpoint, Arizona, to 99 beds at Gallup Indian Medical Center in Gallup, New Mexico (IHS, n.d.). IHS health centers are open 40 or more hours per week and provide comprehensive ancillary services, with some providing emergency services (IHS, n.d.). IHS health stations are open less than 40 hours per week, have limited ancillary services, and no emergency services (IHS, n.d.). The Hopi Health Care Center is part of the Phoenix Area IHS and is located within the Hopi Reservation in Polacca, Arizona (IHS, n.d.). This health care facility provides primary medical services, limited ancillary services, and emergency services to approximately 7,000 Native Americans from both Navajo and Hopi Tribe (IHS, n.d.). There are no health care facilities on either the Navajo or Hopi reservations that are PCI-capable.
Therefore, for an individual who has a STEMI or NSTEMI on the Navajo or Hopi reservations, transport to the nearest PCI-capable hospital would be required.

Services at IHS funded health care facilities are not always comprehensive. Specialty services such as cardiology care and monitoring, stress testing, pacemaker care and maintenance, echocardiograms, percutaneous interventions, cardiac surgery, and cardiac electrophysiology are not available in IHS facilities on Native American reservations. These ancillary and specialty services are limited and, at times, nonexistent. They require referral to health care facilities or specialty clinics off the reservation, often many miles away (United States Government Accountability Office [USGAO], 2005). Residents in rural communities have longer distances to travel for health care and fewer options of services available (USGAO, 2005).

**Navajo culture.** The Navajos identify themselves as Diné which translates into “People.” Traditional Navajos believe they passed through three worlds before entering into the current world, the Fourth World (Iverson, 2002). The number four is important in the Navajo culture: the four worlds (Black, Blue, Yellow, Glittering), the four directions (North, East, South, West), the four seasons (Spring, Summer, Fall, and Winter), the four colors (white, turquoise, yellow, and black), the initial four clans (Towerling House, One Who Walks Around You, Bitter Water, and Mud) and the four sacred mountains of Blanca Peak, Mount Taylor, San Francisco Peaks, and Mount Hesperus (Iverson, 2002). Navajo ceremonies are for protection, prevention of illness, or healing. Healing involves the restoring and maintaining of social, physical, psychological, and spiritual harmony (Iverson, 2002). The Navajo believe they must do whatever possible to maintain harmony and balance on Mother Earth (Navajo Code Talkers, n.d.). Illness is viewed as an imbalance in life. Harmony and health are restored through herbs, prayers, songs and
ceremonies conducted by medicine men (Navajo Code Talkers, n.d.). When approaching a Navajo patient, a health care provider must respect cultural beliefs and healing, provide support if the patient is using Native medication, and be respectful of body painting or application of traditional medication (IHS, n.d.). It is important for health care providers to incorporate traditional Native American medicine with Western medicine. Cultural considerations are as follows: Prolonged direct eye contact is considered impolite. A handshake is a light touching of hands rather than a firm handshake. Point with lips instead of fingers and arms because pointing with fingers is considered impolite. Time is perceived according to time of day (sunrise, morning, afternoon, late afternoon, evening, sunset, night) or more generally (e.g., two days, seasons, lunar cycles). Health decisions involve family members and may take time. Health care providers should also recognize that the Navajo language is descriptive and translating from English to Navajo cannot be rushed. It is also important to be aware that there are different types of traditional healers (crystal gazers, herbalists, stargazers, hand tremblers) and that stating something may happen in the future will cause the event to occur (IHS, n.d.).

**Hopi culture.** The Hopi reservation is in northeastern Arizona, within the Navajo reservation. The name Hopi comes from *Hopituh Shinumu*, which translates into “Peaceful People” or “Peaceful Little Ones.” Hopi cultural beliefs encompass harmony and balance. The Hopi have strong family ties and are deeply spiritual, with religion being a central and crucial part of their everyday lives. Corn is important to the daily and ceremonial life of the Hopi and in its various forms is used in ceremonies, sprinkled on objects or people for purification. An ear of corn provides protection after a birth or a death. The Hopi identify family relationships through clans, named after animals, birds, foods, natural substances, and objects. Cultural considerations
are as follows: The Hopi identify with people who are even tempered and do not participate in arguments. They believe that bad thoughts and wrongful acts cause illness and that disruption of one’s internal peace and harmony promotes disease. They have great respect for Hopi healers (Bonvillain, 2005).

**Access to Healthcare**

The Indian Health Service (IHS), under the Department of Health and Human Services (DHHS), provides federal healthcare services to the Native American population. According to the IHS Year 2015 Profile (IHS, 2015b), IHS services 2.2 million AIANs residing on or near reservations throughout the United States. This presents a financial dilemma in that the IHS does not receive adequate funding for the vast number of Native Americans for whom it provides services. Recently, the IHS annual budget appropriation was $4.6 billion with an IHS expenditure of $3099 per user (IHS, 2015b). This is substantially less than the national health expenditures per capita ($7,535), Medicaid spending per enrollee ($6,206), Medicare spending per beneficiary ($12,042), and Veterans medical spending per enrollee ($6,980; National Indian Health Board [NIHB], 2013). IHS sites provide comprehensive primary care, limited specialty services, and prescription drug coverage. Any other services not routinely available within the IHS service area are funded through contract health service funds (IHS, n.d.). Native American health disparities include a lower life expectancy, higher mortality rates, and disproportionate burden of disease (Sequist et al., 2010). Diseases of the heart, malignant neoplasm, and unintentional injuries are three leading causes of death in the Native American population (IHS, 2015a). Despite these health disparities, IHS remains significantly underfunded and only
receives approximately half of the funding necessary to sufficiently provide health care to the Native American population it serves (Sequist et al., 2010; Westmoreland & Watson, 2006).

In Arizona, only 53% of Native Americans have access to IHS services (Fox & Boerner, 2012). Having access to IHS services is not the same as having health care insurance. Native Americans have access to IHS services available on or near reservations, but for health care not within IHS service areas or for specialty services not available through IHS, uninsured Native Americans may have to pay out of pocket for services not covered by contract health (Fox & Boerner, 2012). In 2010, of the 5.2 million Native Americans in the U.S., 29.2% were uninsured (as compared to 16.3% of the U.S. general population); 36.7% had Medicaid coverage; and 41% had private insurance (U.S. Census, 2010). It is evident that serious gaps exist in Native American access to health care, as well as a misperception that IHS is a comparable option of health care for this population.

In a report by the United States Government Accountability Office (USGAO, 2005), the authors stated that Native American access to health care services in IHS facilities was not always assured. Long wait times, great distances to IHS facilities, lack of transportation (USGAO, 2005), lack of specialty services, as well as inadequate emergency medical service access were all factors that negatively impacted access to health care services.

Another issue identified is the lack of a formal 9-1-1 emergency response system within several reservation communities. An example of this is on the Navajo reservation, where most communities have an established emergency medical service in place but no 9-1-1 emergency response system. If emergency medical services are needed, people call the Navajo Police Department, which then dispatches an ambulance to the scene or place of residence (Navajo
Many Navajos and Hopis live in rural or frontier areas not easily accessible to emergency medical vehicles. Rural areas are open or sparsely settled land of less than 2,500 residents (Sackett, 2012; United Census Bureau, 2010). Frontier areas are sparsely populated areas that have six or less people per square mile (Sackett, 2012). These areas on the Navajo and Hopi reservations lack formal addresses to residential homes, often making it difficult to locate by emergency medical personnel. Other challenges are poorly paved or unpaved roads, lack of electricity or telephone services, and limited services from emergency medical services, police, and fire protection services (Armao, 2014; Chaco, 2012; Landry, 2013, 2015). All these factors contribute to delay in care or lack of access to health care in this population.

Specialty health care services in IHS facilities are extremely limited. Specialized procedures such as cardiac catheterizations, balloon angioplasty, placement of coronary stents, and cardiac surgery are not available at any IHS facility. These specialized procedures and cardiac surgery are available only off the reservation and can be a great distance from IHS facilities. For example, if a patient has a STEMI or NSTEMI in the reservation town of Tuba City, the nearest PCI-capable facility is in Flagstaff, AZ, 75 miles away. For patients requiring an intervention such as cardiac catheterization, balloon angioplasty, or coronary stent placement, prompt transport of the patient to a PCI-capable facility for revascularization is of utmost importance (O’Gara et al., 2013; Steg et al., 2012). For Native Americans living in rural and frontier areas on the reservations, the most important task is to get to an emergency department as soon as possible once recognizing chest pain symptoms suggesting an AMI.
Upon presentation to an emergency department with clinical indicators of a STEMI, total ischemic time ideally should be within 120 minutes from symptom onset (O’Gara et al., 2013; Steg et al., 2012). Primary percutaneous coronary intervention is the reperfusion therapy recommended over fibrinolytic therapy, especially if it can be performed within 120 minutes from time of symptom onset (O’Gara et al., 2013; Steg et al., 2012). If the patient presents to a non-PCI-capable facility, immediate fibrinolytic therapy is indicated (if no contraindications are present and if within 12 hours of symptoms onset) if primary percutaneous coronary intervention cannot be initiated in 120 minutes (O’Gara et al., 2013; Steg et al., 2012). Restoration of coronary perfusion and myocardial tissue reperfusion within these timeframes through primary percutaneous coronary intervention or fibrinolytic therapy reduces rate of morbidity and mortality by about 15-20 percent (Khraim & Carey, 2009; O’Gara et al., 2013). Meeting these timeframes can be difficult for health care providers caring for patients presenting to reservation health care facilities, especially if compounded with a delay in seeking treatment or transfer problems. Transfer problems include limited availability of transport such as ambulance, medical helicopter, or fixed wing to outlying PCI-capable facilities, which could cause delays in reperfusion therapy (personal communication, emergency room physician, March 12, 2010).

Extreme weather conditions often encountered in rural or frontier areas of reservations can also cause delay in seeking or receiving treatment. These conditions include wind, dust storms, snow, or rain that make it difficult for ambulance or air transport to PCI-capable facilities (personal communication, emergency room physician, March 12, 2010). Delays may also be caused by cultural or socioeconomic barriers, including mistrust of non-Native health care providers, not being able to understand or communicate in English, perception of pain, family,
and use of traditional healers and herbal medication. Socioeconomic barriers may be financial limitations, lack of transportation, distance to health care facilities, and lack of insurance. These issues are explored in further detail in Chapter Two.

**Statement of the Problem**

There are 5.2 million Native Americans in the United States (U.S. Census Bureau, 2010). In this population, diseases of the heart, diabetes mellitus, and cerebrovascular diseases were the first, fourth, and seventh leading causes of death in 2013 (National Center for Health Statistics, 2014). Heart disease mortality rates among Native Americans exceed the rates among the U.S. non-Hispanic white population (American Heart Association, 2015; Veazie et al., 2014).

According to Census 2010, in Arizona alone, Native Americans comprised 6% of the total population of 6.4 million (U.S. Census Bureau, 2010). The 21 federally recognized Native American tribes in Arizona (CRH, 2012) and their reservations comprise over one-quarter of the state of Arizona (CRH, 2012). Based on this information, Native Americans likely account for a substantial percentage of patients cared for in rural emergency departments, health care facilities, hospitals, and clinics in Arizona. Advanced practice nurses in the Southwestern United States must be familiar with health problems and cultural aspects of the Native American population due to the significant presence of Native Americans in their region of practice.

Prior to the landmark Strong Heart Study, no studies had indicated that Native Americans had higher rates of cardiovascular disease (CVD) mortality than the general U.S. population or suffered from ACS. The Strong study revealed that not only were there increasing incidence rates of CVD, but the condition was often more fatal in the Native American than in the general
U.S. population (Lee et al., 1998). Prompt presentation for treatment of ACS could reduce morbidity and mortality, thus improving cardiac outcomes in this population.

Examining Native American adults’ perception and description of their ACS symptoms experience and perception of barriers and/or facilitators influencing treatment seeking behaviors will give health care providers a clearer understanding of how to provide culturally sensitive and appropriate cardiac care to this culturally distinct, underserved population.

**Purpose of the Study**

The purpose of this DNP project is to describe the ACS experience of Native American adults who reside in northern Arizona and were diagnosed with an AMI.

**Research Questions**

The research questions that guided this study were:

1. How does this subgroup of Native American adults perceive and describe their ACS symptom experience?
2. What are the perceptions of the barriers and/or facilitators that influence treatment seeking behaviors among this subgroup of Native Americans?
3. What are the self-reported prodromal and AMI symptoms, as measured by the MAPMISS Questionnaire, in this subgroup of Native Americans?

**Definition of Key Terms**

- *Acute Coronary Syndrome (ACS)*: any collection of clinical symptoms associated with an AMI and subcategories include UA, NSTEMI, and STEMI and encompasses both prodromal and acute symptoms (Amsterdam et al., 2014).
• **Acute Myocardial Infarction (AMI):** any evidence of myocardial necrosis consistent with acute myocardial ischemia (Thygesen et al., 2012). NSTEMI and STEMI are types of myocardial infarction.

• **Native American:** a term used when describing American Indians, Eskimo and Aleut populations, and Hawaiian Natives as a whole (IHS, n.d.) and is often used interchangeably with American Indian/Alaska Native. Navajo and Hopi are part of this group. “Native American” will be used throughout this project inquiry rather than American Indian and Alaska Native, for the sake of consistency.

**Significance to Nursing**

Seeking prompt care for AMI symptoms is an important determinant of receiving effective treatment for ACS. The critical aspect in the management of unstable angina/non-ST-elevation myocardial infarction and ST-elevation myocardial infarction is prompt initiation of ACS treatment protocols. The judicious initiation of these time-sensitive protocols is dependent on the time the patient presents to emergency medical services or health care facility. Although there may be numerous reasons why this patient population may not seek prompt treatment for ACS symptoms, health care providers can benefit from Native Americans’ description of their ACS symptoms experience and the barriers and/or facilitators that influence treatment-seeking behaviors. Learning about the ACS experience of Native American adults by examining their perception of ACS, their ACS symptoms experience, and of barriers and/or facilitators influencing treatment-seeking behaviors could allow health care providers to effectively anticipate the needs of this population and provide culturally appropriate and timely interventions for ACS.
The results of this study will assist health professionals in: 1) identifying potential barriers to seeking prompt treatment for symptoms of ACS, and 2) developing culturally-sensitive, community-based education programs directed toward the Native American population to increase awareness of ACS symptoms. The outcome of this DNP project will be to give health care providers a clearer understanding of how to provide culturally sensitive and appropriate cardiac care to this culturally distinct, underserved population.

Health assessment, health maintenance, disease prevention, counseling, and patient education are essential components of the care that advanced practice nurses provide. They are in an excellent position to develop culturally sensitive, community-based programs that raise awareness in the Native American population and among colleagues.

Summary

ACS encompasses unstable angina, NSTEMI, and STEMI. These are associated with a disrupted atherosclerotic plaque, resulting in a partial or complete thrombosis of the infarct-related artery. With heart disease incidence and death rates for the Native American population at an all-time high and at a higher rate than those of the total U.S. population, health care providers need to focus on this significant health threat in the Native American adult population. Disparities encountered with Native Americans result from decreased access to health care, lack of government funding, limited access to IHS services, limited availability to specialty services, absence of a formal 9-1-1 emergency response system, extreme weather or road conditions, and remoteness from PCI-capable facilities.

The treatment for unstable angina, NSTEMI, and STEMI is prompt reperfusion therapy either through fibrinolytic therapy, percutaneous coronary intervention, or coronary artery
bypass. Health care providers can teach community members factors that negatively affect prompt treatment times of ACS, such as lack of knowledge of ACS symptoms, problems with access to health care, transportation, environment, and cultural influences. Early presentation of the Native American adult patient to the emergency department for symptoms of ACS can reduce morbidity and mortality, thus improving cardiac outcomes.

The significance of this study to advanced practice nurses and other health care providers is ACS symptom recognition in the Native American adult population and identification of barriers to seeking prompt treatment for symptoms of ACS, can lead to improved health care access and treatment. The findings can help with the development of community-based education programs culturally tailored for the Native American population to increase awareness of ACS symptoms.
CHAPTER TWO: CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

This chapter describes the conceptual framework and literature review for this DNP project. The Vulnerable Populations Conceptual Model (Flaskerud & Winslow, 1998) comprises the main concepts guiding this DNP project. The review of literature addresses cardiovascular disease and its risk factors, ACS symptoms, access to health care, and health promotion in the Native American adult population.

**Vulnerable Population Conceptual Model**

The Vulnerable Population Conceptual Model (VPCM) is a middle range theory developed by Flaskerud and Winslow (1998) to conceptualize vulnerable population research. Middle range theories have close connections to research and practice (Burns & Grove, 2009). These theories are not as abstract as grand theories and focus more on specific phenomena, allowing for development of clinical practice guidelines (Burns & Grove, 2009).

The VPCM emphasizes population health and proposes that it is the responsibility of the community to make accessible the necessary resources and opportunities for its community members to achieve well-being and maintain optimal health (Flaskerud & Winslow, 1998). The conceptual model consists of the three key concepts indicating degree of vulnerability: resource availability, relative risk, and health status, and the relationships among these concepts. The availability of socioeconomic and environmental resources is a component of resource availability. The ratio of poor health of people who are exposed to the risks and have no resources to those who are not exposed to risks and have resources is relative risk. The prevalence of disease and rates of mortality and morbidity show the health status of a population (Flaskerud & Winslow, 1998).
The relationships that exist among the model concepts of resource availability, relative risk, and health status are: 1) deficient resources lead to increases in relative risk (risk factor exposure); 2) increased risk factor exposure leads to increases in morbidity and mortality; 3) morbidity and mortality can aggravate continued risk factor exposure; and, 4) morbidity and mortality can affect resource availability by causing a depletion of resources (Flaskerud & Winslow, 1998). Nursing research, nursing practice, and ethical and policy analysis have the potential to influence and change the VPCM model concepts as well as the relationships among them (Flaskerud & Winslow, 1998).

In the model, resource availability indicates socioeconomic and environmental availability (Flaskerud & Winslow, 1998). Lack of socioeconomic resources such as human capital (housing, income, employment, education), social connectedness or integration (no family support, marginalization), and social status can lead to disparity in populations (Flaskerud & Winslow, 1998). Health care access and quality of care are environmental resources, and a shortage of these resources results in increased morbidity and mortality (Flaskerud & Winslow, 1998). Relative risk is risk factor exposure and vulnerable populations lack socioeconomic and environmental resources which predispose them to increased risk factors (Flaskerud & Winslow, 1998). Risk factors are also increased based on lifestyle, behaviors, choices, and utilization of health promotion programs. Health status is morbidity and mortality that is age- and gender-specific. An increase in risk factors will result in an increase in morbidity and mortality (Flaskerud & Winslow, 1998).
VPCM for Native American Adults with Cardiovascular Disease

Populations at increased risk for health impairments or susceptible to adverse health outcomes are vulnerable populations (Aday, 1994; Flaskerud & Winslow, 1998). Native Americans experience an increased burden of CVD and coronary heart disease, as well as higher mortality and morbidity rates compared to other racial or ethnic groups (Howard et al., 1999; Lee et al., 1998). These conditions for which Native Americans are at higher risk or more susceptible indicate meeting the definition of a vulnerable population.

Resource Availability

The 2010 Census revealed 5.2 million American Indian and Alaska Natives living in the United States, with the greatest percentage in Oklahoma and California, followed by Arizona, Texas, and then New York (Norris, Vines, & Hoeffel, 2012). Native Americans have some of the highest unemployment rates in the country. According to the 2013 American Community Survey Brief, 2007-2011 national poverty rates were highest for American Indian and Alaska Natives at 27%, as compared to non-Hispanic whites at 11.6% (Macartney, Bishaw, & Fontenot, 2013). In Arizona alone from 2007-2011, 35.1% of Native Americans were below poverty level (Macartney et al., 2013). From 2007 to 2010, the U.S. Native American unemployment rate increased by 7.7% to 15.2%, while the increase for non-Hispanic whites was only 4.9% (to 9.1%) and employment rates for Native Americans decreased from 58.3% in 2007 to 51.5 % in 2010 (Austin, 2010). These numbers reflect the employment disparities of the Native American population. Regarding education, approximately 79% of Native Americans, age 25 and over, were high school graduates or higher, as compared to 88% of non-Hispanic whites in 2011 (United States Census Bureau, 2010). Studies have shown that socioeconomic disparities
correlate with an increase in poverty, morbidity, and premature mortality (Department of Health and Human Services. [DHHS], 2011; Flasgerud & Winslow, 1998; Foraker et al., 2008).

Social connectedness and integration means being connected to mainstream society - being a part of the prevalent attitudes, values, and practices of a society (Flasgerud & Winslow, 1998). Vulnerable populations have limited integration and connection into mainstream society and experience racism and discrimination. This further adds to vulnerability and to adverse health outcomes (Flasgerud & Winslow, 1998; Leight, 2003). Racism and discrimination are areas of significant concern for Native American communities (Gonzales, Harding, Lambert, Fu, & Henderson, 2013; Guadagnolo et al., 2009; Johansson, Jacobsen, & Buchwald, 2006). Stigma and ignorance of cultural norms and appropriateness by health care providers results in barriers to seeking treatment and utilization of health care services by Native Americans with health care needs (Gonzales et al., 2013; Guadagnolo et al., 2009; Johansson et al., 2006).

Another socioeconomic resource that most Native Americans lack is social status. Higher social status indicates groups with power and lower social status indicates those without power. People of higher social status have power over political processes, decision making, and resource distribution, while people of lower economic status do not have the same processes (Flasgerud & Winslow, 1998). Native Americans have limited social connections, socioeconomic resources, and access to health-related resources. These limitations make it difficult for this vulnerable population to effectively improve health outcomes.

Environmental resources are associated with health care access and quality (Flasgerud & Winslow, 1998). Factors limiting Native American access to care include lack of health insurance or other finances, limited health care services, distance from health care facilities, long
wait times at IHS-funded health care facilities, and environmental barriers. Approximately 35% of Native Americans are uninsured (compared with 17% of non-Hispanic whites), and of the uninsured, about 38% have access to IHS-funded programs and 62% have no access to IHS programs (Adams, Kirzinger, & Martinez, 2012).

A misconception by health care providers is that access to IHS is comparable to health insurance. Low income Native Americans with access to IHS-funded health care services are also eligible for free or low-cost health insurance through Medicare or Medicaid. Eligibility for IHS services is not dependent on income or employment status; however, Indian Health Programs (IHP) for each tribe have different eligibility criteria (Fox & Boerner, 2012). For example, Native American patients have access to health care services of a facility of an IHP but would have to pay out-of-pocket for services that facility does not provide. Sometimes outside services are financed by Contract Health Service funds from IHS. Contract Health Services, through IHS funding, purchases health care services from outside providers when there are no available services at an IHS-funded facility.

Poverty level and unemployment severely limit the Native Americans’ ability to obtain health insurance and, therefore, appropriate and necessary health care. For those faced with the possibility of paying out-of-pocket for specialty services and procedures not available with IHPs at health care facilities, the other option is to forego these necessary services due to inability to pay.

Long wait times at IHS funded facilities are a barrier to quality health care for Native people (USGAO, 2005). It is not uncommon to wait two to six months for primary care services and even longer for specialty services (USGAO, 2005). Federal spending cuts have resulted in
longer wait times, health care professional staffing shortages, fewer medical referrals, and delays in construction and renovation of outdated health care facilities on reservations (NIHB, 2013; Fox & Boerner, 2012). In a survey of 380 administrators at 255 IHP facilities, 83% of those surveyed indicated they had a moderate to urgent need for physicians (Merritt Hawkins, 2011). Reported vacancy rates for physicians were approximately 22% and for specialty physicians even higher (Merritt Hawkins, 2011). Over half of the IHP administrators surveyed indicated that access to health care in their service area was compromised. At least 40% said quality of care was compromised due to the shortage of health care providers (Merritt Hawkins, 2011).

The Health Resources and Services Administration identifies shortage areas under the Medically Underserved Areas/Populations (MAU/P) or Health Professional Shortage Areas (HPSA) designations (Health Resources and Services Administration [HRSA], 2013). MUA/P designation involves the application of the Index of Medical Underservice (IMU) to service area data and involves four variables: ratio of primary medical care physicians per 1,000 population, infant mortality rate, percentage of the population with incomes below poverty level, and percentage of the population age 65 years or older (HRSA, 2013). The IMU score ranges from zero to 100, where a score of zero indicates a completely underserved area and 100 indicates a least underserved area (HRSA, 2013). Services areas with an IMU of 62.0 or less qualifies for an MUA designation (HRSA, 2013). Navajo and Hopi areas have a MUA designation (HRSA, 2013). Primary care HPSA designation are given to areas that have a shortage of primary medical care physicians, specifically, when there are 3,500 or more people per primary care physician (HRSA, 2013). Health care facilities on the Navajo and Hopi reservations have primary care HPSA designations (HRSA, 2013).
Environmental barriers may also negatively affect health care access for Native American people living on reservations. On the Navajo and Hopi reservations, many residents live in rural or frontier areas not easily accessible, especially when roads are exposed to rain, wind, and snow. Many Navajo live long distances from the nearest IHP facility limiting access to health care.

**Relative Risk**

Relative risk describes the likelihood of developing a disease in people exposed to risk factors and lacking resources compared with those not exposed to risks and having resources (Aday, 1994; Flakerud & Winslow, 1998). An increase in risk factor exposure along with a decrease in resource availability results in an increase in relative risk in vulnerable populations in the VPCM (Aday, 1994; Flakerud & Winslow, 1998). Coronary artery disease, the development of atherosclerosis in the coronary arteries, is a precursor of ACS. Rates for heart diseases are approximately two times higher in Native Americans, compared with non-Hispanic white adults (Office of Minority Health, 2012). Risk factors for coronary artery disease include diabetes mellitus, hypertension, dyslipidemia, obesity, tobacco use, and sedentary lifestyle. All of these are prevalent in the Native American adult population. In one report, on average, Native Americans were more likely to be hypertensive, obese, current smokers, and inactive than their non-Hispanic white counterparts (Barnes, Adams, & Powell-Griner, 2010). Native American adults (17.5%) were two times more likely to have diabetes mellitus than non-Hispanic white adults (6.6%), and more than one-third (34.5%) of Native American adults have been diagnosed with hypertension, compared with approximately one-fourth of non-Hispanic white adults (Barnes et al., 2010). Only 29% of Native American adults were of healthy weight, 32.7% were
more likely to be current smokers, and 43.8% were more likely to never engage in leisure-time physical activity than their non-Hispanic white counterparts (39%, 22.5%, 34.6%, respectively; Barnes et al., 2010; Office of Minority Health, 2012). These numbers reflect the prevalence of risk factors for coronary artery disease in the Native American population. Increased coronary artery disease risk factors contribute to the increasing numbers of ACS in this vulnerable population.

**Health Status**

Morbidity is the state of being diseased or unhealthy in a community or group. Mortality is the number of people who died within a population. A community’s health status is represented in disease prevalence and morbidity and mortality rates. Increased incidence of disease states or risk factors, such as diabetes mellitus, hypertension, dyslipidemia, obesity, tobacco use, and sedentary lifestyle put this population at greater risk for developing ACS, thus resulting in patterns of increased morbidity and premature mortality (Rhoades et al., 2007). The Native American population has higher mortality rates from heart disease, diabetes, cerebrovascular disease, and other disease states compared to the U.S. all races population (Kochanek, Xu, Murphy, Minino, & Kung, 2011; Rhoades, 2005; Rhoades et al., 2007). Diseases of the heart, diabetes mellitus, and cerebrovascular diseases are the first, fourth, and seventh leading causes of death in the U.S. in 2013 (National Center for Health Statistics, 2014). As heart disease mortality rates in the U.S. general population decrease, rates in the Native American population continue to rise (Howard et al., 1999; Office of Minority Health, 2012). The VPCM provides insight on how resource availability, relative risk, and health status have influences on
vulnerable populations and provides guidance for future nursing research, practice, and policy on innovative ways to obtain and promote optimal heart health in the Native American population.

**Literature Review**

The review of literature is from literature searches conducted August, 2012 through December, 2013, utilizing CINAHL, Medline, OVID, PubMed, Google, and Google Scholar. Individual searches were also utilized using references cited in selected research articles. This review encompasses literature on coronary heart disease and ACS in Native American adults, health care quality and access for Native Americans, and existing Native American CVD health promotion programs. The key words used to guide the searches were American Indian, Native American, Strong Heart Study, Indian Health Service, heart disease, cardiovascular disease, risk factors, acute coronary syndrome, heart attack, coronary heart disease, coronary artery disease, treatment delay, barriers to care, health promotion, myocardial infarction, health disparities, and vulnerable population. The years covered in the database searches were 1995 through 2015 to ensure a thorough representation of literature on the area of interest. A narrower range of years yielded fewer results.

**Coronary Heart Disease in Native American Adults**

Before the 1980s, early studies reported lower rates of morbidity and mortality from heart disease and myocardial infarction in Native American populations than in other U.S. groups (Becker, Wiggins, Key, & Samet, 1988; Sievers & Fisher, 1981). Why was heart disease mortality in Native peoples low when they had the highest prevalence rates for coronary heart disease risk factors such as diabetes mellitus, hypertension, dyslipidemia, and obesity? Due to the paucity of information and conflicting information on coronary heart disease in Native
Americans, researchers initiated the Strong Heart Study in 1988 to study heart disease and its risk factors in Native Americans (Howard et al., 1999). This study had 4549 Native American participants, 45 to 74 years old, in 13 communities in Arizona, Oklahoma, South Dakota, and North Dakota, and with data collected in several phases. The findings of this landmark study brought heart disease and its risk factors in Native Americans to the forefront and changed how researchers viewed this disease in Native Americans. Findings indicated that coronary heart disease incidence rates were almost two times higher than reported in national population studies. Contrary to early studies reporting that CVD rates were low among Native Americans, the Strong Heart Study found that CVD rates were higher and increasing (Howard et al., 1999). Coronary heart disease was also more fatal in Native Americans than in the U.S. population (Howard et al., 1999). A significant determinate of heart disease for Native Americans in this study was diabetes mellitus, with 56% of coronary events in men and 78% of coronary events in women in those with diabetes (Howard et al. 1999). In Native American women, diabetes mellitus, age, obesity, LDL cholesterol, albuminuria, triglycerides, and hypertension were significant independent predictors of heart disease (Howard et al., 1999). In Native American men, diabetes mellitus, age, LDL cholesterol, albuminuria, and hypertension were significant independent predictors (Howard et al., 1999). In another phase of the Strong Heart Study, myocardial infarction and coronary heart disease prevalence rates were higher in Native American men than in women (Howard et al., 1995). High prevalence rates of myocardial infarction (3.8 vs. 1.9) and coronary heart disease (4.6 vs. 1.8) existed in those with diabetes mellitus compared to those who did not have diabetes mellitus (Howard et al., 1995). Significant independent predictors of coronary heart disease in this study were age, diabetes mellitus,
hypertension, albuminuria, obesity, smoking, elevated plasma insulin, and low concentrations of HDL-cholesterol (Howard et al., 1995). In more recent data collected from the 2012 National Health Interview Survey, coronary heart disease continues to be prevalent in the Native American population with 8.1% of Native Americans as compared to 6.1% in non-Hispanic whites, 6.5% in African Americans, and 5.3% in Hispanics having coronary heart disease (Blackwell, Lucas, & Clarke, 2014). In comparison with other ethnic groups and the U.S. population, Native Americans had a higher and increasing incidence of coronary heart disease, which can be attributed to the high prevalence of coronary heart disease risk factors in this population.

**Racial misclassification in Native Americans.** The discrepancy between early and recent studies of heart disease burden in Native Americans has been attributed to racial misclassification (Rhoades, 2005; Stehr-Green et al., 2002). When assessing health in a community or group, estimations of disease burden are needed, and the validity and accuracy of estimations are adversely affected when health or demographic data are not accurately reported in disease registries and vital records (Stehr-Green, Bettles, & Robertson, 2002). Racial or ethnic misclassifications have occurred in health care databases because of subjective observations by health care providers or other health care workers rather than reports by patients or family members (Rhoades, 2005; Stehr-Green et al., 2002). The underestimation of the true burden of heart disease in Native Americans has been attributed to cases being reported in other racial/ethnic categories, resulting in erroneous findings that major coronary heart disease morbidity and mortality rates were low in Native Americans compared to other groups (Rhoades, 2005). It was only in the 1990s that the IHS began to systematically adjust data for racial
misclassification (Rhoades, 2005). In a study by Rhodes (2005), adjustments for misclassifications were made to prior compilations of national vital event data resulting in an 18% increase in mortality rates from diseases of the heart, making this mortality rate highest in Native Americans compared with U.S. all-races or non-Hispanic white populations (Rhodes, 2005). Higher mortality rates for diseases of the heart were in the 45- to 54- and the 55- to 64-year-old Native American group compared with their non-Native American counterparts.

Multiple studies have been conducted on racial misclassification and its implications. Results from a study of the Registry and Washington State death files found that 14.7% of identified AIANs had been misclassified as non-AIAN on death certificates (Stehr-Green et al., 2002). In another study of racial misidentification of AIAN reported to the human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS) Reporting Systems (HARS), 30% of identified AIANs were misclassified (Bertolli, Lee, & Sullivan, 2007). In this study, AIAN people were misidentified as non-Hispanic white (70%), Hispanic (16%), African-American (11%), and Asian/Pacific Islander (2%), resulting in an underestimation of AIAN HIV/AIDS case counts (Bertolli et al., 2007). Researchers corrected race coding in cancer registries of three Northwestern states and after record linkages with Indian health data, they found that 40.7% of identified AIANs had been coded as non-AIAN, frequently coded as non-Hispanic white (77.4%) or unknown race (18.6%; Hoopes, Petersen, Vinson, & Lopez, 2012). In another study, after adjustment for misclassification, the death rates for AIANs were 21% higher than previously recorded rates (Rosenberg et al., 1999). Racial/ethnic misclassification has resulted in serious underestimation of disease states and associated risk factors in the Native American. Accurate racial/ethnic classification is critical for health care providers to get accurate
data that would bring to light the true burden of coronary heart disease in Native Americans and facilitate the development of culturally appropriate heart disease interventions for Native Americans.

**Risk factor and risk factor awareness in Native Americans.** Researchers attribute the high incidence of coronary heart disease in the Native American to increased prevalence of CVD risk factors in this population (Barnes et al., 2010; Howard et al., 1999; Kochanek et al., 2011; Rhodes, 2005; Rhodes et al., 2007). The two categories of coronary artery disease risk factors are modifiable and non-modifiable. Non-modifiable risk factors are age greater than 65, male sex, and family history (American Heart Association [AHA] website, 2013). Modifiable risk factors are diabetes mellitus, hyperlipidemia, hypertension, obesity, physical inactivity, and smoking. Reviewing the progression of risk factor prevalence over time brings into perspective the impact that heart disease morbidity and mortality has on the Native American population (Jernigan et al., 2010). In the U.S., from 2000-2010, Native American men had the highest prevalence of current smoking (33.6%), diabetes mellitus (15.1%), and high blood pressure (31.3%), compared to non-Hispanic white males (21.6%, 7.3%, 26.5% respectfully; Cobb, Espey, & King, 2014). Native American women had the highest prevalence of current smoking (29.5%), diabetes mellitus (14.3), and high blood pressure (28.2%), compared to non-Hispanic white females (20.2%, 5.8%, 22.4% respectfully; Cobb et al., 2014). Native Americans had the highest prevalence of CVD at 12.5%, compared to 10.9% in non-Hispanic whites, 10.8% in African Americans, and 7.8% in Hispanics (Blackwell, Lucas, & Clarke, 2014). The Native American mortality rate for CVD increased by 16%, from 1989 to 1991 and 1996 to 1998, while the rate
for all other U.S. racial/ethnic minorities and the U. S. non-Hispanic white population declined (Howard et al., 1999; Rhoades, 2005).

A study of CVD risk factors and health behaviors related to diabetes mellitus, obesity, hypertension, cigarette smoking, sedentary lifestyle, and low vegetable or fruit consumption used cross-sectional data from the Behavioral Risk Factor Surveillance System (BRFSS) from IHS administrative areas in 36 states in 1995-1996 (N=2548) and again in 2005-2006 (N=11104), with respondents being AIAN women and men aged 18 years or older (Jernigan et al., 2010). The majority of this population was young to middle-aged, 25 to 64 years (75%). Findings revealed that from 1995-1996 to 2005-2006, the prevalence of diabetes mellitus increased by 27%, obesity increased by 25%, hypertension increased by 5% (Jernigan et al., 2010). Older adults, 65 and older, had the highest increase in diabetes mellitus (22%) 1995-1995 to 2005-2006 (Jernigan et al., 2010). Even though smoking decreased, prevalence in AIANs was highest (40%), compared to non-Hispanic whites (27%), African Americans (26%), Hispanics (23%), and Asians (16%). Almost one-third of AIANs reported no leisure-time physical activity in the past month, with Elders more likely to have a sedentary lifestyle than their counterparts (Jernigan et al., 2010). AIANs reported low vegetable or fruit intake, with up to 85% having less than three servings of vegetables or fruit the previous day (Jernigan et al., 2010). In 2005-2006, considering risk factors as a whole, 79% of the AIAN in this study had one or more of the six risk factors, and 46% had two or more (Jernigan et al., 2010).

A systematic review of 16 population-based studies published 1995 to 2005 analyzed differences in CVD risk factors (diabetes, obesity, hypercholesterolemia, hypertension, sedentary lifestyle, and smoking) by race and ethnicity. Race/ethnicity was significantly linked with
hypertension, with African Americans having the highest prevalence among minority groups, compared with non-Hispanic whites (Kurian & Cardarelli, 2007). Diabetes mellitus was significantly more prevalent in African American, Hispanics, and AIANs and more prevalent in AIAN elders 55 year and older, compared with non-Hispanic whites (Kurian & Cardarelli, 2007). There was a higher prevalence for obesity in AIANs and African American women compared with non-Hispanic whites, but hypercholesterolemia prevalence was not significantly higher or lower for any race or ethnic group (Kurian & Cardarelli, 2007). Hispanics had a lower prevalence of smoking and AIANs had a higher prevalence compared with non-Hispanic whites (Kurian & Cardarelli, 2007). Hispanics, then AIANs, followed by African Americans, were more likely to have no leisure-time physical activity (Kurian & Cardarelli, 2007). This systematic review reveals disparities in CVD risk factors in racial and ethnic minority populations, compared with non-Hispanic whites (Kurian & Cardarelli, 2007).

Another study addressed CVD risk factors in the elder population of Native Americans who lived in tribal communities from central Arizona, southwestern Oklahoma, North Dakota, and South Dakota (Rhodes et al., 2007). Data from this study were from the Strong Heart Study and compared changes in the prevalence of hypertension, LDL cholesterol, HDL cholesterol, smoking, and diabetes mellitus over three periods (1989-1991, 1993-1995, and 1997-1999). With older Americans 55 and older becoming the fastest growing population, it is important to know CVD risk factors in this population (Rhoades et al., 2007).

Unfortunately, there is a paucity of literature on CVD risk factors in the aging Native American population. The Strong Heart Study assessed CVD and its risk factors in a group of middle-aged and elderly Native Americans of three tribes from central Arizona, seven tribes
from southwestern Oklahoma, and three tribes from North Dakota and South Dakota (Rhoades et al., 2007). This study of longitudinal changes in CVD risk factor prevalence in aging Native Americans (N=4549), aged 45 to 74, was a population-based ongoing epidemiological study (Rhodes et al., 2007). Characteristics of study participants who died (n=923) during the study were: older age (55 and older; 67%), seen at the Arizona study center (39%), male (49%), hypertension (51%), diabetes mellitus (64%), and current smokers (35%; Rhoades et al., 2007). For males, there was a 45% increase in the prevalence of hypertension with aging, from 1989-1991 to 1997-1999, and for women there was a 66% increase in that same time frame (Rhoades et al., 2007). There was a non-significant decrease in LDL cholesterol in men, and the prevalence of low HDL cholesterol in men and women had an initial rapid increase (Rhoades et al., 2007). While the prevalence of smoking decreased, the prevalence of diabetes mellitus rose for both men (14%) and women (15%), and was highest in Arizona (65%) and highest in women in all three time periods (Rhoades et al., 2007). These findings reflect adverse changes in CVD risk factors in the aging Native American population. More research is needed to improve the knowledge base on CVD risk factors and the adverse effects it has on the aging Native American population.

How do Native Americans perceive their risk factors for heart disease? Knowledge of heart disease risk factors is the initial step in risk factor reduction, but there is little research on Native American risk factor awareness. Two studies addressed awareness of CVD risk factors in Native Americans. In one, a 2003 telephone survey of Native men and women living on or near the seven Montana reservations, provided data on CVD history, risk factors, and perceived risk for CVD (Oser et al., 2006). There was a high prevalence for CVD (26% in men and 15% in
women) and the following risk factors in men and women (N=516) aged 45 and older: diabetes mellitus (24% in men and 26% in women), hypertension (48% in men and 46% in women), hypercholesterolemia (34% in men and 40% in women, smoking (28% in men and 33% in women), and obesity (37% in men and 46% in women; Oser et al., 2006). Native American men and women with multiple risk factors for heart disease were more likely to be aware of their risk compared with those with less modifiable risk factors (Oser et al., 2006). Awareness of heart disease risk factors in Native American men with multiple risk factors versus those without were as follows: CVD (87% with compared to 46% without), hypertension (70% with compared to 44% without), hypercholesterolemia (71% with compared to 53% without), obesity (87% with compared to 52% without; Oser et al., 2006). In Native American women, awareness of risk factors was as follows: CVD (98% with compared to 58% without), diabetes mellitus (74% with compared to 60% without), hypertension (73% with compared to 56% without), hypercholesterolemia (72% with compared to 60% without), and obesity (74% with compared to 55% without; Oser et al., 2006). In the population aged 65 years and older compared with the younger population, there were no significant differences in awareness of heart disease risk (Oser et al., 2006). A significant finding was that Native American men and women who were smoking currently perceived their risk for heart disease the same as non-smokers (Oser, et al., 2006). In this large sample of Native Americans in a community setting, risk factors for CVD were prevalent and a majority accurately perceived the risks of CVD. Others, such as current smokers compared to non-smokers and men with history of CVD compared to women with CVD, were not likely to perceive their risks for heart disease (Oser et al., 2006).
Awareness of the extent of heart disease risk factors among the 13 tribal communities of Native Americans in Arizona, Oklahoma, South Dakota, and North Dakota was examined using data from the Strong Heart study (Schweigman, Eichner, Welty, & Zhang, 2006). Researchers asked participants \( N=3638 \) ages 46-80 if nine known risk factors for coronary artery disease had an effect on a person’s chances of getting heart disease. The nine risk factors addressed were family history, obesity, hypertension, diabetes mellitus, smoking, hypercholesterolemia, high fat diet, sedentary lifestyle, and stress. The findings indicated that, in general, awareness of risk factors for heart disease was high but some subgroups had less awareness of heart disease risk factors. Percentages of correct answers given for each of the nine risk factors were high, ranging from 70% (family history of heart disease) to 90% (obesity). Participants with risk factors of hypertension and diabetes mellitus knew more about heart disease risk factors than those who did not have these disorders. Similar to the Oser et al. (2006) study, smokers knew less about heart disease risk factors than non-smokers.

**ACS Symptoms in Native American Adults**

Some researchers have studied racial and ethnic variations in symptoms of myocardial infarction, but few have focused on Native Americans. The American Heart Association (AHA) reports the warning signs of a heart attack include chest discomfort, upper body discomfort (one or both arms, neck, jaw, stomach), shortness of breath, diaphoresis, nausea, or lightheadedness (AHA, 2013). The AHA further identifies that women are more likely than men to experience other symptoms such as shortness of breath, nausea, vomiting, back or jaw pain (AHA, 2013). In a study of ethnic variations in acute myocardial symptom presentation, participants were: European \( n = 117 \), Chinese \( n = 92 \), South Asian \( n = 92 \), South Asian \( n = 101 \), Southeast
Asian \((n = 57)\), and First Nations Native American \((n = 39)\) patients presenting to emergency departments in Calgary, Alberta, Canada (King, Khan, & Quan, 2009). First Nations are Native Americans who are indigenous to Canada. First Nations patients were younger and more obese. More were current smokers, and had a history of a previous MI than their counterparts when diagnosed with an AMI (King et al., 2009). They were more likely to report syncope and confusion than the other ethnic groups (King et al., 2009). The First Nations patients reported mid-ternal pain (77%), shortness of breath (56%), arm pain (36%), nausea or vomiting (36%), and mid-ternal pressure (28%) with their initial presentation of an AMI (King et al., 2009).

Findings from a study of racial differences (between non-Hispanic whites, African Americans, and Hispanics) in prodromal and acute symptoms of myocardial infarction in women indicated that these symptoms differed significantly among races (McSweeney et al., 2010). The 10 most frequently reported prodromal symptoms among these races were: unusual fatigue, sleep disturbances, anxiety, shortness of breath, frequent indigestion, heart racing, new vision problems, any chest pain/discomfort, change in thinking/remembering, and appetite loss (McSweeney et al., 2010). The 10 most frequently reported acute symptoms among these races were: shortness of breath, any chest pain/discomfort, weakness, unusual fatigue, dizziness, hot/flushed, left arm sensations, indigestion, diaphoresis, and nausea (McSweeney et al., 2010). Minority women composed of African Americans and Hispanics were more likely to be younger, have less education, and less household income than non-Hispanic white women (McSweeney et al., 2010). Minority women also reported having a greater body mass index, hypertension, and diabetes mellitus before an AMI (McSweeney et al., 2010). Minority women, on average, reported more prodromal symptoms and more acute symptoms than non-Hispanic white women.
Among all women, unusual fatigue (73%) and sleep disturbance (50%) were the most reported prodromal symptoms and 18 of the 33 prodromal symptoms significantly differed by race (McSweeney et al., 2010). The most reported acute symptom by all women was shortness of breath. Of the 37 acute symptoms, 22 significantly differed by race (McSweeney et al., 2010). Although this study did not include Native Americans and only compared non-Hispanic white, African American, and Hispanic women, the significant findings of racial differences in prodromal and acute symptoms of myocardial infarction indicate the need to study potential differences in Native Americans.

ACS symptom awareness. What do Native Americans know about symptoms of ACS or heart attack? There is little current published research on ACS symptom awareness in the Native American population. In contrast, there are many studies on ACS symptom awareness in other groups such as non-Hispanic whites, African Americans, and Hispanics. In selected studies, ACS symptom awareness was significantly lower in socioeconomically disadvantaged and minority groups than in non-Hispanic whites (Greenlund et al., 2004; King et al., 2009; McGruder et al., 2008). These studies included very few, if any, Native Americans. Those who are of female sex, younger age, seen by a cardiologist, and have participated in a cardiac rehabilitation program had more knowledge of AMI symptoms (Dracup et al., 2008). Men and those of older age, less education, and lower socioeconomic status have had less ACS symptom awareness (Greenlund et al., 2004; McGruder et al., 2008). In one study (Dracup et al., 2008), 44% of patients had significant gaps in knowledge of ACS even with a medical history of coronary heart disease or an AMI, while another study (Greenlund et al., 2004) showed that patients with heart disease risk
factors of hypertension and dyslipidemia or prior myocardial infarction had more awareness of heart attack symptoms and called 9-1-1 more than others.

A report on heart attack signs in Native Americans and non-Hispanic whites living in Montana used data from the 2005 BRFSS survey (Montana Cardiovascular Health and Diabetes Programs, 2008). Study participants assessed their awareness of the heart attack symptoms of jaw, neck, or back pain/discomfort; weakness; feeling faint or lightheaded; chest pain/discomfort; arms or shoulder discomfort/pain; and shortness of breath (Montana Cardiovascular Health and Diabetes Programs, 2008). The results indicated that Native Americans were less likely than non-Hispanic whites to identify chest discomfort/pain as a warning sign for heart attack, and less than half correctly recognized warning signs for heart attack (Montana Cardiovascular Health and Diabetes Programs, 2008). The findings of the Montana Cardiovascular Health and Diabetes Programs (2008) found that Native Americans had a low level of AMI symptom awareness.

**Treatment seeking behaviors for ACS.** The American Heart Association (AHA) 2013 Heart Disease and Stroke Statistics update indicates that 7.6 million Americans had a myocardial infarction in 2010 (Go et al., 2013). Approximately 70% of coronary heart disease deaths occur out of hospital, before patients even arrive to the emergency department (Go et al., 2013), so the amount of time from onset of symptoms of ACS to treatment presentation can make a significant difference in outcomes. Early reperfusion therapy reduces total myocardial necrosis, resulting in preservation of left ventricular function, prevention of heart failure, and reduction of other cardiovascular complications (Go et al., 2013). In a study, infarct size was reduced by 51% when thrombolysis was initiated within one hour after onset of symptoms, and a 13% reduction of
infarct size was achieved when thrombolysis was initiated later than two hours after symptom onset (Simoons et al., 1986). In another study, the 30-day mortality rate increased from 1% to 6.4% with a time to direct coronary angioplasty of 60 minutes or less to 90 minutes or greater, respectively (Berger, et al., 1999). With every 15 minute delay after the first 60 minutes, the risk of death increased 1.6 times (Berger et al., 1999).

Identifying factors that lead to delay in seeking treatment would facilitate strategies enabling earlier reperfusion therapy efforts in ACS, thus reducing morbidity and mortality. Factors that have contributed to delay in seeking treatment for ACS symptoms are advanced age, race, sex, low income, type or lack of insurance, dissimilarity of symptom expectation, presence of coronary heart disease risk factors, consultation with health care provider or family member, self-treatment, and not attributing symptoms as cardiac (Devon, Hogan, Ochs, & Shapiro, 2010; Foraker et al., 2008; Moser et al., 2006; Saczynski et al., 2008; Zerwic, Ryan, DeVon, & Drell, 2003). Cultural factors contributing to treatment delay for ACS are lack of trust in health care providers, perceived discrimination, low satisfaction with prior medical care, and perceived difficulties that may be encountered due to the language barrier (Moser et al., 2006). Social, cognitive and emotional factors that increase delay in treatment seeking behavior are living alone at time of onset of symptoms, thinking that symptoms are not serious, waiting for symptoms to subside, feelings of being a bother, embarrassment, and fearing the consequences of seeking help (Moser et al., 2006). Studies on factors that contributed to significant treatment delays identified low household income (< $33,533) and being a Medicaid recipient (Foraker et al., 2008); female sex (delayed 3.5 hours longer than men), older age and having intermittent symptoms (Devon et al., 2010); and of African-American race (delayed 3.25 hours longer than non-Hispanic whites)
and being hospitalized at an inner-city university medical center (Zerwic et al., 2003). Treatment delay of AMI increases mortality and morbidity, delaying of life saving interventions. The Worcester Heart Attack Study revealed that patients with delayed presentation times were less likely to receive thrombolytic therapy and percutaneous coronary intervention within 90 minutes of arrival to the hospital (Saczynski et al., 2008). Studying Native Americans’ sociodemographic, cultural, clinical, social, cognitive, and emotional factors that contribute to treatment delay of ACS would provide health care providers with evidence needed to develop tailored and culturally sensitive programs to increase ACS symptom awareness and reduce CVD and heart disease morbidity and mortality in Native American communities.

**Health Care Quality and Access for Native Americans**

Racial and ethnic disparities in health have resulted in poor health outcomes in the Native American population. Causes for these health disparities have been attributed to distrust of health care facilities and providers, lack of knowledge, lack of cultural awareness among health care providers, no access to IHS services, lack of insurance, and family and work responsibilities (Call et al., 2006; Guadagnolo et al., 2009; Hunt, Gaba, & Lavizzo-Mourey, 2005; Zuckerman, Haley, Roubideaux, & Lillie-Blanton, 2004). Minnesota health care program enrollees reported barriers in access to health care, with Native Americans being more likely than non-Hispanic whites to report racial discrimination, misunderstanding of culture by health care providers, personal responsibilities due to family and job, difficulties with transportation, limited clinic hours, problems seeing their preferred provider, and lack of respect for cultural beliefs and traditions (Call et al., 2006). In one study, less trust and satisfaction with physicians were prevalent in racial and ethnic minorities compared with non-Hispanic whites, with the most
prominent differences in the Latino, Native American, Asian American, and Pacific Islander populations (Hunt, Gaba, & Lavizzo-Mourey, 2005). The barriers identified in these studies may likely be the reasons that Native Americans delay in seeking treatment or even forego treatment for AMI symptoms.

Researchers compared health care access and utilization in Native Americans and non-Hispanic whites (Zuckerman et al., 2004). In this study, Native Americans were less educated, poorer, younger, and had worse health than non-Hispanic whites (Zuckerman et al., 2004). They also had lower rates of employer health coverage, higher rates of public or state coverage, and were almost three times more likely to be uninsured than non-Hispanic whites (35% vs. 12%; Zuckerman et al., 2004). Other significant findings were that Native Americans had more problems accessing health care, had more unmet health care needs, were less likely to utilize health care, were less confident in their family’s access to care, and had more dissatisfaction with the quality of care than their White counterparts (Zuckerman et al., 2004). They were also less likely to utilize basic medical care and health professional/doctor visits than non-Hispanic whites, and over 50% of uninsured low-income Native Americans did not have access to IHS (Zuckerman et al., 2004).

Researchers studied response behaviors to chest pain, demographic characteristics, access to health care, health status rating, and history of CVD in Native American women enrollees (N = 866) in the Inter-Tribal Heart Project from three rural reservations in Minnesota and Wisconsin (Struthers, Savik, & Hodge, 2004). Seventy-one percent of the women reported household annual incomes equal to or less than $25,000, over one-third were unemployed, and 62% had a high school education or less (Struthers et al., 2004). Health care access for women was through
rural sources and mostly provided by IHS (88%). The greatest distance traveled to a health care facility was 30 miles, with the majority living within 10 miles (Struthers et al., 2004). Thirteen percent of the women reported that they had been unable to access health care in the past two years due to long wait times (49%), transportation problems (11%), lack of childcare, long travel times to health care facility, or the inability to pay (3.6%); and not being able to take time off work (2.6%; Struthers et al., 2004). When asked what their action would be if they experienced crushing chest pain lasting longer than 15 minutes, one-third (32%) of the Native American women reported a passive response and responded that they would “sit down and wait until it passed” (23%), “go to a medical facility when it becomes convenient” (3%), or “continue what I was doing and hope it goes away” (2%) (Struthers et al., 2004, p. 161). The women who had a passive response to chest pain were younger age and less education (Struthers et al., 2004). This study identified some problems Native Americans have with health care access, as well as response behaviors to chest pain in Native American women.

A barrier to health care access for some Native Americans can be language. Understanding heart disease risk factors and how they increase the risk for ACS begins with a comprehension of what health care providers are trying to teach. There is little to no comprehension of health information when Native Americans do not understand or speak English. Non-English speaking adults are less likely to correctly identify health attack symptoms (McGruder et al., 2008). Ensuring the presence of translators would likely improve comprehension and reduce compliance barriers in vulnerable populations.

Native Americans have a higher burden of disease, higher overall mortality and morbidity rates, and lower life expectancy compared with the general U. S. population, with
contributing factors being insufficient education, disproportionate poverty, health care discrimination, and differences in culture (Indian Health Service, 2015a). Researchers studied ambulatory quality of care and barriers to quality improvement reported by physicians within IHS service units throughout the United States from 2002 to 2007 (Sequist et al., 2010). Improvements occurred in clinical performance for 10 out of 12 measures, including adult vaccinations, testing for cholesterol, and blood pressure/cholesterol monitoring for diabetes mellitus and CVD. Researcher found that physicians perceived low rates of sufficient access to quality specialists (29%) and non-emergent hospital admissions (37%), quality diagnostic imaging (32%), and quality behavioral health services (16%; Sequist et al., 2010). A “very important” barrier was cited by IHS physicians as being lack of specialty providers in close proximity (32%) and inadequate IHS funding to support delivery of health care (Sequist et al., 2010; p. 483). This perspective from IHS physicians adds to evidence of Native American patient concerns with quality of health care in IHS service units.

**Health Promotion and Heart Disease Prevention Programs**

Developing culturally sensitive and appropriate health promotion and heart disease prevention programs can be a challenging undertaking. Taking already existing programs from urban areas or from other non-Native American groups may not be appropriate for Native American communities. Awareness of cultural beliefs, customs, values, and way of life would assist in the development of programs and provide a basis for more success in achieving desired outcomes.

The “Steps to a Healthier Anishinaabe” program implemented health promotion intervention activities in several Anishinaabe-Ojibwe Native American communities in Michigan
(Edgerly et al., 2009). In the language of the Ojibway, “Anishinaabe” means “original people” (Edgerly et al., 2009). This program was unique in that it allowed each community to customize health promotion interventions to their specific culture and health priorities. The program used a community-based framework that involved: 1) a tribal coordinator in each community, 2) development of a community action plan in each tribe, 3) culturally appropriate and tribe specific best practice interventions, 4) continued technical assistance, and 5) respect for tribal sovereignty (Edgerly et al., 2009). By the fourth year, the program reported over 11,600 participants in intervention activities (Edgerly et al., 2009). Intervention activities of the “Steps to a Healthier Anishinaabe” program included a wellness program for casino employees, consisting of health screenings, health education, nutrition and fitness consultations, exercise programs, tobacco cessation, and more healthful menu offerings in employee cafeterias (Edgerly et al., 2009). Another intervention activity was a walking competition between communities, with the winning community averaging greater than 1.2 million steps per participant (Edgerly et al., 2009). This was a popular 17-week program that promoted competition between Anishinaabe communities and at the end of the program, resulted in community members continuing with walking and tracking their steps (Edgerly et al., 2009).

Program developers established a heart disease prevention program addressing increased heart disease risk factors in Alaska Native women called “Traditions of the Heart” (Witmer, Hensel, Holck, Ammerman, & Will, 2004). The intervention consisted of 12 weekly sessions on lifestyle modification and goal setting (Witmer et al., 2004). Program staff measured participants’ height, weight, resting blood pressure, fasting lipid levels, and serum glucose levels at the start of the program and again at 12 months (Witmer et al., 2004). Program developers
worked closely with Alaska Native staff and community members in the design, development, and initiation of the program (Witmer et al., 2004). The manual, heart healthy cookbook, and interventions reflected Alaska Native traditions and culture. This more holistic and cultural-specific approach to heart disease prevention program development resulted in significant improvements in moderate walking, confidence in maintaining physical activity, and heart-healthy eating at 12 weeks; but were no significant differences in levels of cholesterol, blood pressure, or heart rate, and only two participants quit smoking in the intervention period (Witmer et al., 2004). A majority of participants reported that they would recommend the program to others, viewed the individual counseling and goal setting as “very helpful” (Witmer et al., 2004, p. 576), and rated the heart-healthy cookbook from “good” to “very good” (Witmer et al., 2004, p. 577).

In a report on public health options for improvement of heart health in older Americans, the authors recommended that successful risk factor and disease management in older adults should include consideration of life expectancy, quality-of-life concerns, and prevention of future adverse events (Greenlund, Keenan, Clayton, Pandey, & Hong, 2012). Researchers recommend community-based cardiovascular risk prevention programs that have cardiovascular risk assessment and use of peer volunteers, and they reported that these types of programs reduced hospital admissions for an AMI among adults, aged 65 and older (Greenlund et al., 2012). Older Americans have multiple co-morbidities and for successful management of these multiple conditions, an integrated program approach for chronic disease management and prevention is essential (Greenlund et al., 2012). Examples of this are integrating arthritis intervention with other chronic disease and health prevention programs and integrating heart
failure monitoring programs with health promotion and heart disease prevention programs. Another concept was community-based services, which are more accessible to community members (Greenlund et al., 2012). From a cardiovascular perspective, these services could include automatic defibrillators in the community; cardiopulmonary resuscitation training; blood pressure, glucose, and cholesterol checks; health screenings; pacemaker interrogations; medication reconciliation; post-hospital discharge follow-up; and cardiovascular health promotion efforts. In order to improve cardiovascular health and quality-of-life in older Americans, health care providers need to consider multiple and innovative approaches, such as suggested (Greenlund et al., 2012). Health care providers can apply these approaches in Native American communities. The most effective way to reduce heart disease mortality and morbidity, from this author’s viewpoint, is bringing community-based services into Native American communities.

**Summary**

The conceptual framework for this DNP project is the Vulnerable Populations Conceptual Model, which comprises the main concepts guiding this DNP project. The VPCM places an emphasis on community health and proposes that the responsibility of the community is to make accessible the necessary resources and opportunities for its community members to achieve well-being and maintain optimal health. Prior to the 1980s, researchers thought prevalence of coronary heart disease in Native Americans was lower than in other racial and ethnic groups. The Strong Heart study, along with studies on racial misclassification, revealed the opposite to be true. Native Americans had the highest mortality and morbidity rates for heart disease and the highest prevalence rates for associated risk factors then other racial and ethnic
groups. The review of literature revealed few studies of symptoms of ACS in Native Americans and this reflects the need for more research on variations of ACS symptoms in this population. Studies found lower awareness of ACS symptoms and greater delay in seeking treatment in socioeconomically disadvantaged and minorities which contribute to increased mortality and morbidity, as well as a delay in life saving interventions. Native American health disparities are attributed to decreased health care quality and limited access to health care. Further research is needed to increase awareness of cultural, socioeconomic, and environmental barriers to health care quality and access in the Native American population. Development of health promotion and prevention programs needs to begin at the community level because through collaborative efforts between community members and health care providers, these programs may have a better chance at being successful in reducing cardiovascular health disparities in Native American communities. Health care providers, tribal and community leaders, and community members need to work together to identify heart disease risk factors, ACS symptoms, treatment seeking behaviors, health care quality and access barriers specific to Native American communities, to reduce heart disease morbidity and mortality in this vulnerable population.
CHAPTER THREE: METHODOLOGY

Chapter Three is a description of the research methodology used in this study. This chapter presents the study design, setting, sample, protection of human subjects, instruments used, data analysis, and trustworthiness. The research questions that guided this study were:

1. How does this subgroup of Native American adults perceive and describe their ACS symptom experience?
2. What are the perceptions of the barriers and/or facilitators that influence treatment seeking behaviors among this subgroup of Native Americans?
3. What are the self-reported prodromal and AMI symptoms, as measured by the MAPMISS Questionnaire, in this subgroup of Native Americans?

Study Design

A qualitative dominant mixed methods design was used to describe perceptions of the ACS experience among Native American adults diagnosed with an AMI who reside in northern Arizona. A mixed method design allows for the exploration of the meaning of a phenomenon from both a qualitative and a quantitative approach (Tashakkori & Teddlie, 2010). The qualitative dominant mixed methods research emphasizes a qualitative view of the research process with the quantitative results informing the qualitative results of the phenomenon under study (Hossain, 2012; Johnson, Onwuegbuzie, & Turner, 2007). This type of mixed methods research is symbolized as QUAL→quan. The “QUAL” represents the core or dominant component and the “quan” represents the less dominant component (Johnson et al., 2007; Tashakkori & Teddlie, 2010). The “→“ represents that the methods are implemented
sequentially with the qualitative data being collected and analyzed first, followed by the
quantitative data being collected and analyzed.

In this study, a semi-structured interview guide (a qualitative descriptive core component;
Appendix G) was used to answer research questions one and two. The second less dominant
component of this study was a quantitative method used to answer research question three. These
two interviews took place separately, one to two weeks apart, with the second interview being
conducted by telephone. The McSweeney Acute and Prodromal Myocardial Infarction Symptom
Survey (MAPMISS, Appendix H) was the tool used to collect participants’ self-reported
prodromal and AMI symptoms. The findings of both methods were compared for overlapping
and complimentarity between the two methods. A complementarity design seeks to elaborate,
enhance, illustrate, and clarify results from one method with the results from the other method
(Greene, Caracelli, & Graham, 1989). The purpose for the selection of this research design was
to present a more complete picture of the phenomenon under study and to increase
interpretability and meaningfulness by identifying strengths, weaknesses, or knowledge gaps
from each method. This study exhibits a complementarity design.

**Qualitative Description**

The qualitative component research method is qualitative description (QD). The purpose
of QD is to describe the participants’ personal experience and interpretation of the world and its
phenomena, making it appropriate for gaining a clearer insight on the questions of “how,”
“What,” and “why” relating to human behavior, views, and perceived barriers (Neergard, Olesen,
Andersen, & Sondergaard, 2009). The goal of QD is to provide a rich and straightforward
description of participants’ experience with an event in everyday language that would be easily
understood by others (Sandelowski, 2000). In QD, the researcher uses data from one-on-one interviews or focus groups, health records, and observations (Sullivan-Bolyai, Bova, & Harper, 2005). QD is also a naturalistic inquiry in which the researcher uses minimal inference interpretation and the resulting data portray descriptive and interpretive validity (Sullivan-Bolyai et al., 2005). This not to imply that QD studies are deficient in the way they are conceived or conducted. Interpretation of data still occurs and results in findings that are “data-near” (Sandelowski, 2010). The analysis of data gathered from participants’ emerging commonalities and differences give the qualitative researcher in-depth insight into participants’ perspective of the world and its phenomena.

QD is an appropriate method to use in vulnerable populations with health disparities. The QD method is useful in the development and improvement of clinical interventions that can lead to the reduction of health care disparities in vulnerable populations (Sullivan-Bolyai et al., 2005). How can we know what interventions will be most culturally appropriate, accepted, and used by Native American communities if we do not explore the “how,” “what,” and “why” of their personal experience and interpretation of the world and its phenomena? Because results from a QD study can provide a clear, personalized account of participants’ experiences, researchers can identify participants’ perceptions of the phenomenon under study and develop culturally innovative ways to improve care (Sullivan-Bolyai et al., 2005). QD is the method of choice for this study because it will provide rich data containing the personal interpretations of prodromal and acute symptoms experience of ACS and influences on the decision to seek treatment for AMI in the Native American adult population.
The QD method can provide results close to the participants’ direct experience, culturally harmonious with their health disparity experience (Sullivan-Bolyai et al., 2005). QD can give deep and vivid information about the issues and concerns that participants have about health care while retaining cultural and environmental elements (Sullivan-Bolyai et al., 2005). This method facilitates intervention development for reduction of health care barriers and disparities for vulnerable populations.

**Setting**

The site of this study was Flagstaff, Arizona, the largest city in northern Arizona, near the southwestern border of the Navajo reservation. Flagstaff lies at the base of San Francisco Peaks and comprises over 64 square miles. The close proximity to Native American reservations, historic Route 66, and influence of the railroad industry make this a community of diverse peoples, cultures, and languages.

The medical facility providing access to participants is Flagstaff Medical Center (FMC). FMC represents 36 medical specialties and staffs over 150 physicians, nurse practitioners, and physician assistants. FMC is the northern Arizona regional referral center for cardiac care, level-one trauma, specialized diagnostics, high-risk maternal and fetal care, and cancer. FMC is the nearest PCI-capable facility for cardiac patients in northern Arizona and nearby Native American reservations. Heart and Vascular Center of Northern Arizona (HVCNA) is a partnership with FMC that provides services that includes general cardiology, rhythm abnormalities, treatment of chronic heart and vascular conditions, and advanced cardiac and vascular surgical procedures. HVCNA is comprised of cardiologists, interventional cardiologists, an electrophysiologist, cardiothoracic and vascular surgeons, and specialty trained nurse practitioners and registered
nurses. The principal investigator (PI) is an acute care cardiology nurse practitioner who, in collaboration with HVCNA physicians, manages continuity of care and discharge planning for cardiovascular patients in an inpatient setting.

The study took place with participants recruited from HVCNA. The first interview, conducted by the PI with each participant, took place in the PI’s private office, located at the Northern Arizona Healthcare (NAH). The second interview, also conducted by the PI, took place over the telephone, one to two weeks following the first interview.

**Sample**

The convenience sample for this study consisted of members of the Navajo and Hopi tribes. The sample size was nine Native American male participants, 45 years and older, who had undergone a PCI for STEMI or NSTEMI within the past 12 months, as identified in the Cardiac Patient Discharge Log (CPDL). Native Americans adults either lived locally or were transferred in from the Navajo and Hopi reservations in northern Arizona. Sample inclusion criteria supported transferability of findings to the population of Native American adults within northern Arizona, from the Navajo and Hopi reservations because participants were selected from this subgroup of Native Americans.

**Sampling**

In qualitative research, purposive sampling is a non-probability sampling technique in which the researcher selects participants who can provide rich data on the phenomenon being studied (Patton, 2002). In QD, data collection and analysis take place concurrently and, as this process evolves, sampling needs can change and require flexibility (Milne & Oberle, 2005). The goal of sampling in QD is to recruit participants who can provide rich data for the purpose of the
The purpose of this DNP project was to describe the ACS experience among Native American adults diagnosed with an AMI who reside in northern Arizona. The purposive sampling technique best suited for this purpose was convenience sampling. Convenience sampling is a non-probability sampling method in which data is collected from participants who are conveniently available (Onwuegbuzie & Leech, 2007; Patton, 2002). Convenience sampling allowed data collection from participants who met selection criteria and were available and agreeable to participate in the study (Onwuegbuzie & Leech, 2007; Patton, 2002). This sampling technique allowed for flexibility and helped provide the sample size needed to reach saturation. This purposeful sampling technique provided the participants for this study.

Sample: Size, Inclusion/Exclusion Criteria

The aim of sample size in qualitative studies is not to be representative of the general population but to provide the number of participants needed for saturation of data and to answer the research questions (Onwuegbuzie & Leech, 2007; Patton, 2002). Determinations regarding sample size are not clear-cut and qualitative researchers have varying opinions on sample sizes for qualitative studies (Milne & Oberle, 2005; Onwuegbuzie & Leech, 2007; Sandelowski, 1986, 1995). According to Sandelowski (1986), sample sizes for qualitative research must be small because of the large amount of verbal data obtained from interviewing participants. Researchers obtain data through sometimes lengthy interviews. Sample size in QD is not predetermined. Upon saturation, recruitment of participants ceases (Milne & Oberle, 2005; Onwuegbuzie & Leech, 2007; Sandelowski, 1986, 1995). Saturation occurs when no new themes are emerging, existing themes are well-developed, and there are sufficient data to thoroughly explain the phenomenon studied (Milne & Oberle, 2005; Onwuegbuzie & Leech, 2007; Sandelowski, 1986,
Tribal members were from the tribes identified in the inclusion criteria. In this study, saturation occurred with a sample size of nine participants.

The inclusion and exclusion criteria for study participants included:

1. 45 years and older.
2. Self-identify as being Native American, or use the term American Indian, Navajo, or Hopi.
4. History of having undergone a PCI for STEMI or NSTEMI within the past 12 months, as identified in the CPDL.
5. Agreeing to participate in two interview sessions: one to complete the demographic questionnaire and semi-structured interview; and the other to complete the McSweeney Acute and Prodromal Myocardial Infarction Symptom Survey (MAPMISS) questionnaire.

Exclusion criteria included:

1. Unable to recall prodromal and acute symptoms of ACS and/or maintain a conversation.

**Recruitment of Participants**

The registered nurse care coordinator (RNCC), identified potential participants from the CPDL. The CPDL is a log of HVCNA cardiac patients that have been discharged from Flagstaff Medical Center and contains information such as the medical record number, patient name, diagnoses, interventions/procedures performed, and follow-up care information. This log is maintained by HVCNA nurse practitioners and the RNCC, and is used to facilitate follow-up
calls on HVCNA cardiac patients to ensure they have and continue to take appropriate medications, follow-up, as well as to address any concerns the patient may have had post-discharge. This log is not a part of the patient medical record.

The RNCC identified potential participants from the CPDL who met the inclusion criteria. The RNCC did not have knowledge of which participants were selected for the study and did not assist with data collection or analysis. The RNCC contacted potential participants by telephone or in person using the recruitment script for initial contact (Appendix A) and asked if they would be interested in participating in this study. If they were interested, she provided them with the PI’s contact information and informed them they will be contacted by the PI or they can initiate contact and schedule an appointment with the PI for the first interview. If the participant did not schedule an appointment for the first interview with the RNCC, the PI contacted the potential participant and used the Recruitment Script (Appendix B) to provide a personal introduction, a brief overview of the study, and asked if they would be interested in participating. If the potential participant expressed interest in participating, the PI scheduled an appointment for the first interview.

For participant convenience, the interview was scheduled on the same day of the participant’s follow-up appointment with their cardiologist after they were discharged from the hospital. Following their appointment with their cardiologist, the PI would accompany the participant to the PI’s office for the initial interview. During the first interview, the PI provided a more detailed description of the study, confirmed eligibility, obtained informed consent, and conducted the demographic questionnaire and semi-structured interviews. The nine initial interviews which were approximately 45-60 minutes were conducted in the privacy of the PI’s
office, behind closed doors. The second interviews which were approximately 30-35 minutes, one to two weeks later, were telephone interviews and consisted of the PI asking questions from the MAPMISS questionnaire.

The RNCC identified 58 potential participants who met inclusion criteria and of these, 30 declined to be in the study; 28 agreed to be in the study. Of these remaining potential participants, 19 did not make their interview appointments due to various reasons. All but one of these 28 participants who agreed to be in study did not live in Flagstaff, where the initial interviews took place. They were traveling from their homes on the Navajo or Hopi reservations, which could be up to 200 miles away, to Flagstaff, Arizona. Those who did not have personal transportation were driven in by non-emergency medical transport services that were on a time schedule and did not allow a few of the participants to stay for another hour after their cardiologist appointment. Some of the participants stated they had other obligations that took preference or that it was a long distance to travel home and they needed to get back on the road, so they were not able to stay for the interviews. Some of the participants did not show up for their cardiologist appointment and did not reschedule. Nine study participants completed the first and second interviews. Two of the nine participants requested that their wives be present during the first interview.

**Human Subjects’ Protection**

The PI obtained institutional review board (IRB) approval through the Office for the Responsible Conduct of Research from The University of Arizona, NAH IRB Administration, and HVCNA prior to the start of the study. The Office for the Responsible Conduct of Research from The University of Arizona gave approval for NAH IRB to be the designated IRB of record.
The Deferral of IRB Oversight acknowledgement and Authorization Agreement are in Appendix C. The PI met with staff from the NAH IRB Administration and asked for permission to recruit participants and conduct the study. The PI had a letter of approval from the NAH IRB Administration stating that participants could potentially be recruited from their facility. The letter of approval from the NAH IRB Administration is in Appendix D.

If the potential participant met inclusion criteria and agreed to participate, the PI provided the participant with an explanation of the purpose of the study, procedures, possible risks and benefits, the right to refuse to participate or withdraw from the study, confidentiality, contact information, and amount of time required to participate in the study (Appendix E). The PI assured potential participants that their decision to participate, not participate, or withdraw from the study would not have an effect on the care they receive from health care providers. Prior to the signing of the informed consent by the participant, the PI had them answer five questions to assure that they understood the study. These questions were: 1) Who is conducting the study? 2) What is the purpose of the study? 3) What is being asked of you to participate in this study? 4) What are the risks to participating in this study? 5) What are the benefits to participating in this study? If they did not correctly answer a question, the PI reviewed that section of the informed consent form. Once they accurately responded to each question, they were invited to sign the informed consent form. The PI reviewed the informed consent verbally and in writing with each participant, informed potential participants that the interview process would take place in two separate sessions to reduce participant burden, and each session would be approximately one hour in length. The PI requested their permission to audiotape the semi-structured interview session. If a participant refused to be audiotaped, it was explained to them that responses would
need to be recorded in writing during the interview. All participants agreed to be audiotaped. Upon their signing of the consent, the PI informed participants that to conceal their identity a pseudonym would be assigned to their transcription and used throughout the study.

**Use of Interpreters**

In this study, the PI used interpreters as consultants only. They were not present in either interview sessions. Throughout the interviews, only the Navajo participants would briefly revert back to their Native language for one to three words. The one Hopi participant did not use his Native language throughout the interviews. If during the interview sessions, the participant briefly reverted back to his Native language, the PI used an interpreter during the transcription process to review de-identified data segments to assure that those words and their true meanings were accurately translated into English. Although the PI understood Navajo, only the required narrative needed to contextualize the Navajo word(s) used by the participants were shown to the interpreter to ensure that the PI’s interpretation correctly captured the true meaning of what the participant was saying. The PI met with the interpreter prior to the initiation of the study and provided a brief synopsis of the study, reviewed the study purpose, and clarified the interpreter’s role.

**Data Collection Procedure**

The PI conducted the first and second interviews. The length of the nine initial interviews conducted by the PI ranged from 45-60 minutes. The first interview began with brief social comments to establish rapport, re-explanation of the purpose of the study, obtaining of the informed consent, and explain the process of asking questions in the demographic questionnaire (Appendix F) and semi-structured interview guide (Appendix G). This first interview consisted
of completing the demographic questionnaire followed by open-ended questioning using the semi-structured interview guide for their heart attack experience, their knowledge about heart disease and its risk factors, reasons for seeking or not seeking treatment for ACS symptoms, and their ideas on how to increase awareness of CAD and ACS symptoms in Native American communities. Each participant had agreed to being audiotaped during the semi-structured interview portion of the first interview session and the PI recorded the interview on a digital recorder. The PI conducted the semi-structured interview with nine participants at which time saturation was achieved and the research questions were answered. At the end of the first interview, the PI scheduled an appointment for the second interview. The length of the second interview ranged from 30-35 minutes and consisted of asking questions from the MAPMISS questionnaire (Appendix H). The PI conducted this session as a telephone interview. The PI used field notes to record self-perceptions, self-reflections, and documentation of clinical observations noted during the interviews (Krefting, 1991; Milne & Oberle, 2005). To further understand the ACS symptom experience of Native American adults, the PI paid attention to signs that participants had more to tell and encouraged them to expound upon their experiences and feelings. This ensured rich data.

**Instruments**

**Demographic Questionnaire**

Demographic data described select characteristics of the participants. The PI collected data from a researcher constructed demographic questionnaire. The demographic questionnaire had questions addressing: sex, employment, household members, disability information, health insurance, usual health care provider, primary language, place of residence, utilities, distance to
nearest health care facility, and transportation information. The demographic questionnaire is in Appendix F.

**Semi-structured Interview Guide**

A researcher-constructed semi-structured interview guide consisted of five questions on participants’ heart attack experience, knowledge about heart disease and its risk factors, reasons for seeking or not seeking treatment for ACS symptoms, and participants’ ideas on how to increase awareness of CAD and ACS symptoms in Native American communities. The fifth question was generated by the PI based on clinical observations of participants having little knowledge of heart disease and its risk factors and also to elicit ideas how to increase ACS awareness in Native American communities. Additional probing questions were asked to elicit their AMI symptom experience and treatment seeking behaviors, including their thoughts of how to best inform tribal members of risk factors for ACS. The PI conducted each interview individually used open-ended interview questions and probes in this study. The semi-structured interview guide is in Appendix G. Another source of data was field notes documenting PI observations and insights during data collection, including thoughts about the data collection process.

**MAPMISS Questionnaire**

The symptom survey questionnaire for this study was adapted from the McSweeney Acute and Prodromal Myocardial Infarction Symptom Survey questionnaire (McSweeney, O’Sullivan, Cody, & Crane, 2004), which the interviewer used to ask questions verbally of the participants. The adaptations to the MAPMISS questionnaire were the exclusion of questions pertaining only to female participants, when interviewing the male participants (questions 17-
The MAPMISS survey addresses symptoms experienced during a heart attack, reasons for seeking treatment, comorbidities, risk factors, physical activity and demographic data. The MAPMISS assesses 37 acute and 33 prodromal symptoms of myocardial infarction. In the MAPMISS survey, prodromal and acute symptoms are classified as general or as discomfort/pain (McSweeney et al., 2010). Prodromal symptoms are defined as symptoms occurring before the AMI, which were new or changed in frequency or intensity, intermittent, and resolved or returned to pre-AMI levels (McSweeney et al., 2010). Symptoms occurring with the AMI and resolving with treatment are classified as acute symptoms (McSweeney et al., 2010).

Authors of the MAPMISS tested the instrument and found it to have high content validity and acceptable test-retest reliability (McSweeney et al., 2004). Using MAPMISS in a study, researchers compared prodromal and acute symptoms of myocardial infarction among African Americans, Hispanics, and non-Hispanic whites (McSweeney et al., 2010). The McSweeney et al. (2010) study found significant racial differences in prodromal and acute symptoms of myocardial infarction with minority women reporting more acute symptoms. The populations studied by McSweeney et al. (2010 & 2014) using the MAPMISS were non-Hispanic whites, Hispanics, and African Americans, with one study reporting two Native American women from a final sample of 515 women (McSweeney et al., 2003) and another study reporting one Native American woman from a final sample of 40 women (McSweeney et al., 2004). In another study looking at prodromal symptoms developed from MAPMISS, researchers studied sex differences in these symptoms of ACS and found a significant interaction between sex and prodromes, with improved one-year survival in women seeking help for prodromal symptoms compared to men.
(Graham, Westerhout, Kaul, Norris, & Armstrong, 2008). The MAPMISS was developed to assess heart attack symptoms in women (McSweeney et al., 2004). Upon review of the literature, there were two studies that used the MAPMISS to evaluate sex differences in ACS symptoms in both men and women (Khan et al., 2013; Norris, Hegadoren, Patterson, & Pilote, 2008). In the Khan et al. (2013) study, it was found that chest pain was the most prevalent symptom in both men and women. The second study found that women reported higher prodromal scores than men, with fatigue being the most frequently reported symptom (Norris et al., 2008). The PI attempted to recruit both men and women for this study but all participants who completed the study were male. The MAPMISS questionnaire is in Appendix H.

Data Management

The PI de-identified data and developed a data tracking system to account for all the data collected (i.e., data and consent forms stored in locked files in the PI office, audio files of interviews downloaded and given file names, status of each data file). The PI digitally audiotaped, transcribed verbatim, and checked for accuracy of all transcripts. Recordings from the semi-structured interviews were analyzed using the Atlas.ti version 7 qualitative software program. The PI entered responses from the demographic questionnaire and MAPMISS questionnaire into SPSS 22.0 GP statistical software program.

Data Analysis

Qualitative Content Analysis

Qualitative content analysis is “the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns” (Hsieh & Shannon, 2005, p. 1278). The focus is on communication and text content of what
researchers obtain in interviews with participants. Data in this study were from questionnaires and recorded interviews, supplemented by researcher field notes. The recordings were transcribed verbatim by the PI into a Microsoft Word document and then entered into the Atlas.ti version 7 qualitative software program that facilitated data storage, data management, data files, and codes. The Atlas.ti version 7 program was used to create codes, subcategories and categories from the data. The PI identified codes, which are categories with similar meanings developed from large amounts of text data through intense examination of participant language (Hsieh & Shannon, 2005; Krippendorff, 2013). There are three approaches to qualitative content analysis: conventional, directed, and summative content analysis (Hseih & Shannon, 2005). Conventional content analysis occurs when coding categories are derived directly and inductively from text data (Hsieh & Shannon, 2005). Researchers use conventional content analysis when there is limited research literature or existing theory on a phenomenon (Hsieh & Shannon, 2005). The PI used the conventional content analysis approach in this study. The reason for selecting this approach is because little is known about the ACS symptom experience in the Native American adult population. In this approach, researchers absorb themselves in the data, allowing themes or concepts to surface from text data.

For this study, the PI used qualitative content analysis, based on the conventional content analysis approach described by Hsieh and Shannon (2005). Data analysis proceeded as follows:

1. The PI thoroughly read and reread all transcribed data from the interviews to achieve data immersion and to gain an understanding of each interview as a whole.
2. Participants described their AMI symptoms experience, which provided the data bits that were coded and categorized. The PI highlighted significant meanings from the
exact words of the participants and from field notes. No new themes or data bits emerged after nine interviews.

3. As the PI identified commonalities in data with codes, subcategories, categories and themes emerged from codes based on how meanings of each code were related. The PI arranged codes into categories with similar meanings.

4. There was continuous critical review of codes, subcategories, categories, and themes that emerged from the data. This involved the evaluation of the “fit” and importance of the codes, subcategories, categories, and themes emerging from the data. Notations were made to clarify how the codes fit the text. Another important strategy was to understand who each study participant was through demographic questions and from the MAPMISS tool as well as from field notes. This enabled the PI to accurately understand and represent the experiences the participants described.

5. The PI reviewed each transcript and compared with previous coded transcripts and any new codes, subcategories, categories or themes that emerged were added to the code list.

6. The transcripts, codes, subcategories, categories and themes were reviewed and examined by the faculty advisor, an experienced researcher, and qualitative methods expert.

7. The PI recorded the decisions and practices used in the process of content analysis and reviewed research findings to describe them in the results and discussion section of the study.
An advantage to conventional qualitative content analysis is that there is no imposition of rigid and fixed categories on what study participants say about their perceptions of the phenomenon under study (Sandelowski, 2000). Challenges for the researcher to address are deficiencies in achieving a thorough understanding of content from data, resulting in a failure to identify important categories (resulting in inaccurate findings that do not correspond to the text data) and confusing this approach with grounded theory or phenomenology (Hsieh & Shannon, 2005).

Quantitative Analysis

The quantitative portion of this study was completed with data collected from the MAPMISS and demographic questionnaires. The PI administered the demographic questionnaire during the first encounter. One to two weeks later, the MAPMISS questionnaire was administered, via telephone, to each of the nine participants. At the start of the second interview, the PI reviewed the analysis of the first interview data with each participant and asked if it was an accurate representation of their ACS symptom experience. The PI encouraged the participants to comment if there was anything they would like to add. The PI read the questions from the MAPMISS to each participant.

Prodromal symptoms were measured from questions 11 and 13 from the MAPMISS tool. These symptoms were weighted according to frequency (0 to 6, with 1 being less than monthly and 6 being daily) and severity (0 to 3, with 3 being most severe; McSweeney et al, 2010). The prodromal score was calculated for each symptom by multiplying the intensity and frequency, then these scores were summed for an overall prodromal index score (range, 0-594; McSweeney et al., 2004). The number of prodromal symptoms for each participant was also calculated.
Acute symptoms were measured from the 12 responses to question 4, the 25 responses from question 6, and the one ‘other’ from question 7. The acute symptoms acuity score was weighted on severity only, since these events occurred at the time of the AMI and resolved with treatment. Each acute symptom was weighted according to severity (0 to 3, with 3 being most severe) and then summed for an overall acute symptoms acuity index score (range, 0-114; McSweeney et al., 2010). The number of acute symptoms for each participant was also calculated.

**Complimentarity**

Complimentarity is used to elaborate, enhance, illustrate, and clarify results from one method with the results from the other method (Greene et al., 1989). Complimentarity was the approach used to present a more complete picture of the phenomenon under study and to increase interpretability and meaningfulness. The two research methodologies (QUAL→quan) applied in this study were the qualitative dominant portion (QUAN) using the semi-structured interviews and the quantitative portion (quan) using the Demographic and MAPMISS questionnaires. The findings from both methods were compared for overlapping and complimentarity between the two methods. The quantitative findings from the MAPMISS tool further informed the qualitative findings of the semi-structured interviews in this study.

**Trustworthiness**

There are several criteria used by researchers to establish trustworthiness in qualitative research. The four criteria the PI used to assure trustworthiness of this study were credibility, dependability, confirmability, and transferability (Lincoln & Guba, 1985). Enhancing rigor in qualitative research involves sampling techniques that are flexible yet systematic, allowing
participants to speak freely, transcription accuracy and coding directly from data, and a constant attention to context (Milne & Oberle, 2005). Qualitative research “seeks not to reveal ‘truth’ but to generate insights…to describe and understand the nature of reality through participants’ eyes with careful and on-going attention to context” (Milne & Oberle, 2005, p. 413). In this study, it was imperative to describe the symptom experience of ACS among Native American adults through their experience. Meticulous and constant attention during data collection ensured study findings reflected participants’ perception of the AMI symptom experience.

**Credibility**

Credibility and authenticity are closely related. Study credibility needs to correlate with its purpose. Credibility refers to the believability of the study. Reflecting credibility, authenticity is assurance that research findings accurately replicate participants’ perceptions of the phenomenon under study (Milne & Oberle, 2005; Whittemore, Chase, & Mandle, 2001). The truth-value of a qualitative study is dependent on how well the researcher remains true to experiences as lived and perceived by participants (Krefting, 1991; Lincoln & Guba, 1985; Sandelowski, 1986). The PI maintained credibility and authenticity in this study by allowing the participants to speak freely, listening to what they had to say, and partnering with a Navajo interpreter to assure accurate representation of data during the transcription process. Several strategies in this study supported credibility. The sampling techniques described allowed for collection of data on the AMI symptom experience of Native American adults. Participants who met selection criteria as persons who could provide the necessary data participated. Participants told their stories and experiences in their own words and in a way that was most comfortable for them. Precise transcription accurately portrayed perceptions and experiences of the participants.
Word-for-word transcription of interviews ensured data authenticity and integrity. The PI reviewed tapes and compared them to transcripts to assure accuracy. Transcription of data occurred as soon as possible after the interviews to support accuracy of transcription of words heard.

**Dependability**

Qualitative research values the uniqueness of participant experiences and how meaning and themes emerge from their experiences (Krefting, 1991; Lincoln & Guba, 1985; Morrow, 2005). Dependability refers to the consistency of the data (Krefting, 1991; Lincoln & Guba, 1985; Morrow, 2005). This is the process that is followed to ensure consistency of findings over time, researchers, and analysis techniques, thus making findings clear and repeatable. The PI documented detailed descriptions of methods of data collection, analysis, and interpretation of study findings, allowing another researcher to easily follow the steps of this study. Another strategy for dependability included a peer examination. A peer examination helps the researcher stay close to the data and ensures that study findings clearly reflect the perceptions of participants (Milne & Oberle, 2005). This was useful especially when participant meaning was not as clear when investigating codes and categories. The PI reviewed codes and categories throughout the research process with her project chair, to make certain that these codes and categories corresponded with data obtained from the interviews. The PI discussed with colleagues and the chair emerging themes to make certain that there was consistency between themes and findings, as well as to invite suggestions for alternative interpretations and conclusions.
Member checks involve reviewing with the participant the interviewer’s interpretation of the results of the interview (Milne & Oberle, 2005). An example of this was asking, “Is this what you meant when you said…?” The researcher used member checking to ensure that what study participants said during the interviews accurately reflected their views and major points summarized prior to the conclusion of the interview. To conduct member checks, the PI also contacted participants after data analysis to review findings and ask for validation of the accuracy of the findings.

Dependability was also achieved through triangulation which involved the application of two research methodologies (QUAL→quan) in this study: the qualitative portion through Semi-structured Interviews and the quantitative portion through the MAPMISS Questionnaires. The findings of both methods were compared for overlapping and complimentarity between the two methods.

**Confirmability**

Confirmability is based on the belief that research is never objective (Krefting, 1991; Morrow, 2005). Research findings should represent, as closely as possible, the phenomenon being studied rather than researcher beliefs or biases (Lincoln & Guba, 1985). Confirmability is an important part of a study’s integrity and is an indication of the crucial review that takes place in every part of the research process. The PI demonstrated this through constant review and self-analysis (Milne & Oberle, 2005; Whittemore et al., 2001). The PI maintained constant awareness that researchers can influence findings through researcher interpretations, assumptions, and knowledge. Maintaining constant critical appraisal for these throughout the qualitative research process was facilitated through journaling.
A challenge for the PI in this study was the threat of “going native” (Sandelowski, 1986). Going native refers to the researcher becoming too involved or having too close a relationship with participants that objectivity becomes non-existent. The PI being Native American and having experienced the same issues with health care and coming from a similar cultural background made her aware of this potential threat to the trustworthiness of this study. Another threat was the problem of reactivity, which is researcher influence on participant response (Maxwell, 2013). It is impossible to completely eliminate reactivity from qualitative studies but it is important for the researcher to maintain vigilance to prevent it as much as possible. For example, being interviewed by a Native American researcher seemed to put participants more at ease and allowed for openness and therefore a collection of rich data. On the other hand, the PI maintained awareness of any personal verbal or non-verbal cues during the interview process that would negatively influence participants from telling their personal perceptions of their ACS experience. Journaling was a process of writing thoughts from self-reflection on potential influences or threats to the research process, and anything the PI considered relevant to the study.

**Transferability**

Transferability refers to the extent to which others can apply study findings to other settings or groups (Lincoln & Guba, 1985). Purposeful sampling techniques provided rich data on the ACS symptom experience. The PI provided dense background information on participants, as well as on the setting, data collection, and analysis processes. This allows other researchers to assess how transferrable the findings of this study can be to similar settings or groups. It is important to be aware that transferability is the responsibility of the individual evaluating applicability of findings (Lincoln & Guba, 1985). The responsibility of the researcher
is to enhance transferability through a thick description of the participants’ experience with the phenomenon under study (Lincoln & Guba, 1985).

**Summary**

This chapter described the methods used in this study of Native Americans adults’ prodromal and AMI experience and influences on the decision to seek treatment. In this chapter, the study design, setting, sample, human subjects’ protection, data collection, and data analysis were provided. The criteria used to assess trustworthiness in this study consisted of credibility, dependability, confirmability, and transferability.
CHAPTER FOUR: FINDINGS

This study described the ACS experience of Native American adults who reside in northern Arizona and were diagnosed with an AMI. Chapter Four contains the findings of the data analysis from the interviews and the MAPMISS questionnaire and the responses to the research questions that guided this study:

1. How does this subgroup of Native Americans perceive and describe their ACS symptom experience?

2. What are the perceptions of the barriers and/or facilitators that influence treatment seeking behaviors among this subgroup of Native Americans?

3. What are the self-reported prodromal and AMI symptoms, as measured by the MAPMISS questionnaire, in this subgroup of Native Americans?

The description of the population was obtained from the demographic data in the Demographic and MAPMISS questionnaires. The themes, categories, subcategories, and codes from the qualitative content analysis answered research questions one and two. The findings (descriptive statistics) from the MAPMISS questionnaire answered research question 3, corroborated, and expanded on the findings from the semi-structured interviews.

Participants

The participants in the study were Native American adult males from northern Arizona, residing on the Navajo and Hopi reservations. A total of 58 met inclusion criteria, 30 declined to be in the study, and 28 agreed to be in the study. Of these 28, 19 did not make their initial interview appointments. Three of the 19 were female but none of them made their appointments for the initial interview. The remaining nine Native American participants were male and
provided the sample for this study. Two of the participants requested that their wife be present for the interview and this request was honored.

TABLE 1. Demographic Data (N=9).

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>n</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>9</td>
<td>100</td>
</tr>
<tr>
<td>Age at Time of Initial Interview (mean ± SD)</td>
<td>(58.6 ± 8.2)</td>
<td></td>
</tr>
<tr>
<td>50-59 years old</td>
<td>5</td>
<td>55.6</td>
</tr>
<tr>
<td>60-69 years old</td>
<td>3</td>
<td>33.3</td>
</tr>
<tr>
<td>≥ 70 years old</td>
<td>1</td>
<td>11.1</td>
</tr>
<tr>
<td>Age at First MI (mean ± SD)</td>
<td>(58.3 ± 8.4)</td>
<td></td>
</tr>
<tr>
<td>50-59 years old</td>
<td>5</td>
<td>55.6</td>
</tr>
<tr>
<td>60-69 years old</td>
<td>3</td>
<td>33.3</td>
</tr>
<tr>
<td>≥ 70 years old</td>
<td>1</td>
<td>11.1</td>
</tr>
<tr>
<td>Race: Enrolled or Principal Tribe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian: Navajo</td>
<td>8</td>
<td>88.9</td>
</tr>
<tr>
<td>American Indian: Hopi</td>
<td>1</td>
<td>11.1</td>
</tr>
<tr>
<td>Annual Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ $10,000</td>
<td>3</td>
<td>33.3</td>
</tr>
<tr>
<td>$30,000-$39,000</td>
<td>1</td>
<td>11.1</td>
</tr>
<tr>
<td>$60,000-$69,000</td>
<td>1</td>
<td>11.1</td>
</tr>
<tr>
<td>$80,000-$89,000</td>
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<tr>
<td>Ballpark Annual Income</td>
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<td>≤ $30,000</td>
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<td>11.1</td>
</tr>
<tr>
<td>≥ $30,000</td>
<td>2</td>
<td>22.2</td>
</tr>
<tr>
<td>Employed at Time of Heart Attack</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>5</td>
<td>55.6</td>
</tr>
<tr>
<td>No</td>
<td>4</td>
<td>44.4</td>
</tr>
<tr>
<td>Health Insurance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td>3</td>
<td>33.3</td>
</tr>
<tr>
<td>Medicaid (AHCCCS)</td>
<td>4</td>
<td>44.4</td>
</tr>
<tr>
<td>None</td>
<td>2</td>
<td>22.2</td>
</tr>
<tr>
<td>Comorbidities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Blood Pressure</td>
<td>6</td>
<td>66.7</td>
</tr>
<tr>
<td>Diabetes/Pre-diabetes</td>
<td>5</td>
<td>55.6</td>
</tr>
<tr>
<td>Chronic Heartburn/Stomach Problems</td>
<td>3</td>
<td>33.3</td>
</tr>
<tr>
<td>High Cholesterol</td>
<td>3</td>
<td>33.3</td>
</tr>
<tr>
<td>Chronic Lung Disease/Empysema/Asthma/bronchitis</td>
<td>2</td>
<td>22.2</td>
</tr>
<tr>
<td>Chronic Back Pain</td>
<td>2</td>
<td>22.2</td>
</tr>
<tr>
<td>Chronic Joint Problems/Arthritis</td>
<td>2</td>
<td>22.2</td>
</tr>
<tr>
<td>Stroke</td>
<td>1</td>
<td>11.1</td>
</tr>
<tr>
<td>Smoking</td>
<td>1</td>
<td>11.1</td>
</tr>
<tr>
<td>BMI at Time of Heart Attack</td>
<td>(27.1 ± 3.8)</td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>4</td>
<td>44.4</td>
</tr>
<tr>
<td>Overweight</td>
<td>3</td>
<td>33.3</td>
</tr>
<tr>
<td>Obese</td>
<td>2</td>
<td>22.2</td>
</tr>
</tbody>
</table>
The average time from their heart attack to the first interview was 54.11 ± 67.46 days (range 15-233). Participants ranged from age 50 to 74 years with a mean age of 58.3 years at the time of their first heart attack and ranged from age 51 to 74 years with a mean age of 58.6 years at the time of their initial interview (Table 1). Eight of the participants were Navajo and one was Hopi (Table 1). All participants were married (Table 1). Five of the nine participants were employed prior to their heart attack and represented an income range from less than $10,000 to $80,000 with almost half (4 of 9) with a yearly income of less than $39,000 (Table 1).

Seven of the nine reported having some type of insurance (Arizona Health Care Cost Containment System [AHCCCS] or private) and receiving their health care through the Indian Health Service. All participants resided on the reservation. The average distance participants traveled to the nearest health care facility was 19.08 ± 26.01 miles (range 0.25-75). Eight participants were transported by air from a health care facility on the reservation to the PCI-capable hospital in Flagstaff, Arizona. The other participant was living in Flagstaff at the time of his heart attack and presented to FMC emergency department on his own accord after symptoms of chest discomfort and shortness of breath. A synopsis of the demographic data is shown in Table 1.

**Results**

The results from the qualitative portion are presented by major themes, categories, subcategories and supporting codes. Research questions one and two were answered from these qualitative findings. Research question three was answered from the quantitative findings as measured by the MAPMISS questionnaire.
Qualitative Results

Domain 1: The ACS Symptom Experience

This section addresses research question one: How does this subgroup of Native Americans perceive and describe their ACS symptom experience? Data analysis was completed through inductive coding. Two major themes were identified: 1) *Heart Attack Symptoms* and 2) *Heart Disease Awareness*. These two major themes explain the participants’ ACS symptom experience.

*FIGURE 1*. The ACS Symptom Experience.
Theme: Heart attack symptoms. The theme, Heart Attack Symptoms, was derived through commonalities identified in the open coding of data where participants described the symptoms they experienced leading up to their heart attack (prodromal symptoms) and on the day of the heart attack (acute symptoms), as well as their interpretations of these symptoms. Three categories emerged from this theme: 1) Prodromal Symptoms, 2) Acute Symptoms, and Interpretation of Symptoms (Figure 1). Two participants described symptoms leading up to their heart attacks (prodromal). Brian had intermittent symptoms that became progressively worse over the time span of one year. Chris had neurological symptoms one to two months before his heart attack.

“All actually, I felt this pain about a year ago. It’s been there for about over a year. Off and on, it just go away and go away and go away and come back and go away. But lately in the last 3 to 4 months I noticed it was getting more and more pronounced” (Brian).

“Well, we were...let me put it this way. Before the day of my episode, prior to that, maybe a month or two, I noticed that my coordination was diminished, my balance was diminished, umm, I having a little problem walking, maintaining balance, umm, my vision was sort of blurred, umm [unclear word] symptoms, I think now that I read about them and I said, hey, I..I had that...I wasn’t sleeping well, poor sleep cycles...” (Chris).

All the participants described symptoms occurring on the day of their heart attack (acute symptoms). Symptoms most frequently described were chest pain (7 of 9), increasing discomfort (5 of 9), altered level of consciousness (4 of 9), gastrointestinal symptoms (vomiting, heartburn, indigestion) (3 of 9), shortness of breath (3 of 9), and sweating (3 of 9). Three participants described symptoms exacerbated by activity and three participants described no symptoms with activity. Common descriptors used by the participants for chest discomfort were “pain” or “hurting.” Gordon’s wife mentioned that her husband’s chest was “hurting.”

“The pain in my heart really became acute at that point” (Chris).
“So I went over there doing the shoveling for about two hours, that’s when I feel that pain” (Dean).

“I went to sleep, then ahh, the, then that’s Monday morning. Then the, ahh, got up with my chest pain like 9:30 or 10” (Fred).

“With the exertion and the practicing and the heat I just felt sharp pain and I went outside, and with the cooler air, brought more sharp pain” (Harry).

The majority of participants perceived their symptoms to be something other than their heart (6 of 9). Two participants attributed their symptoms to asthma and four participants attributed their symptoms to indigestion or heartburn.

“So I’ve got…I’ve got asthma, also. So I thought, that was part of it, ahh, but I wasn’t wheezing or anything though” (Abel).

“I kept ... I thought it was my .. umm .. my .. ahhh .. my ahhhh asthma my ahh .. I thought it was asthma. Somehow the heart attack was masked as the symptom of asthma, because I’m asthmatic. I thought it was my asthma, yes” (Chris).

“I thought it was heartburn” (Brian).

“I thought it was like a gas coming up or something...heartburn. I thought it was like heartburn” (Ivan).

Theme: Heart disease awareness. The theme, Heart Disease Awareness, was derived through commonalities identified in the data and generated by the participants as they reflected on their ACS symptom experience. Subcategories and categories emerged from the open coding of data where participants described their perceptions of heart disease and their belief that this could not happen to them.

The first category, Little Knowledge, emerged from the subcategories: 1) Education from others and 2) Education from self (Figure 1). The participants had little to no knowledge of heart disease or its risk factors. They described getting little education from others or not educating themselves, thus having little knowledge about heart disease or its risk factors (8 of 9).
“Not too...not too much. But before all this started, I always...I was always told that my cholesterol was high. You know, it was always like 200, 250, 280, somewhere in there but...so I didn’t really pay attention to that leading into possible heart attack because of plaque build-up. I knew that [inaudible] that I...I didn’t educate myself or stop myself to change my diet and hopefully prevent it in that umm. As...as far as heart disease not that much” (Abel).

“Heart disease..I thought it had to do with your diet, stress... No, no, not too much..too much about it, no...I thought it was heartburn” (Brian).

“Prior to that, ahhh...very little actually, to be honest. I didn’t pay too much attention to heart health” (Chris).

“Nah uh” (shakes head no, when questioned if he had prior knowledge of heart disease risk factors) (Dean).

“Ahhh, no not really” (when questioned if he knew about heart disease risk factors) (Eldon).

“No, I didn’t know” (when questioned if he knew about heart disease risk factors) (Fred).

“I know nothing about heart disease. [chuckling] This is the first time, ahh” (Ivan).

“They never told us that” (regarding heart disease risk factors) (Gordon).

The second category, Not Me, emerged from the subcategories: 1) It’s not going to happen to me and 2) I was healthy/active (Figure 1). The participants described disbelief that having a heart attack was something that could happen to them. This perception was enforced by the participants having a “not me” way of thinking or declaring a healthy or active lifestyle prior to their heart attack. Participants described feelings of “it’s not going to happen to me” or not being serious about their health/heart disease risk factors (7 of 9).

“Yeah, that’s, that’s always, that’s always that it’s not going to happen to me” (Abel).

“Other than that. [sighs] really seriously, I think I wasn’t, I wasn’t serious about it” (Chris).

“Didn’t think it would happen ever happen or you would be..become a victim of a heart attack or should I say, a recipient of a heart attack. Well, I think that being a diabetic, I was very much aware that, yeah, I was as risk of me having a heart attack, but...again
seriously, didn’t think that you would ever going to experience anything like that” (Chris).

“I kept..I kept saying this don’t happen to us, this happens to other people [chuckles]. I mean it was totally, tot...it to me, it was a shock” (Dean’s wife).

“Ahhhh, no, not really. [unclear words]…not happen to me, that kind of feeling... And I think, ahh, us Navajo we think...we think, umm, nothing is going to happen to me” (Eldon).

“Can’t be...” (Gordon).

Dean’s wife, who was present in the interview, expressed disbelief and shock that her husband had a heart attack. She had heard of it happening to other people but didn’t think it would happen to them.

Participants perceived that having a healthy and/or active lifestyle precluded them from having a heart attack (5 of 9).

“I’m active enough, I work, I do enough work, it’s..it’s not going to happen to me, yet...Superman mentality” (Abel).

“We eat all right because I’m a diabetic” (Dean’s wife).

“I was active. I was always working as a maintenance man. Carrying things around, fixing stuff” (Eldon).

“He was a very active man...” (Gordon’s wife).

“I didn’t think it would with my age because I am very active. I went to school for physical education. I coached football, basketball, baseball, all my years when I came home. And I was active...” (Harry).

The third category, Teaching Others, emerged from the subcategories: 1) Education by self, family, and school, 2) Education in a healthcare setting, 3) Education at gathering places, and 4) Education through reading and listening (Figure 1). The subcategories were inductively coded from the participants’ responses on what they felt would be the best approach to teach other Native Americans about heart disease and heart disease risk factors. Almost half of the
participants felt that heart disease education should be provided by themselves, family members or at school and should be started at a young age (4 of 9). These participants felt that teaching was the responsibility of the parents and elders and teaching should begin in the childhood years and maintained throughout the school years.

“The younger generation needs to know and the only way you can get, and I shouldn’t say the only, one of the ways that you can get that information out to them is through school. Some of their health classes and you really need to present real life examples, like us here. This is something we..we weren’t taught this in school. Some of their health classes and you really need to present real life examples, like us here. This is something we...we weren’t taught this in school...maybe we were but we didn’t think it was real. I think health problems is down to the infants now, they’re born, our kids are born at risk...we don’t recognize it. And as mothers, as parents, as grandparents we need to get that information down to them. And their health education has to be maintained and sustained through their school years” (Chris).

“It’s hard because, in...in the situation like this ahh, it..it has to start maybe with the family when the...when the children are growing up. You got to start with that. And all that, you need to get started when they’re really young because once they turn that....ahh...ahh...18 age they over....they, you know, over run you. And once they 18, you have no...have no say whatsoever” (Harry).

One participant described being more aware of his body and listening to his body would help in educating others about heart disease.

“Just to be honest with you...Know your body, know your eating habits, know your physical activities. Are you healthy or not healthy? And be honest with your body, listen to your body. What is your body telling you? Those kinds of issues. And the most important I would say is, we’re all at risk” (Chris).

A majority of participants felt that heart disease education is best done in healthcare settings by healthcare providers (6 of 9).

“Well, you know, I..I have actually thought on ..meditated on those particular issues. Who’s responsible for these kinds of information being..getting out? Health care providers particularly. Predominately, all government run programs have...have not functioned well. Their ability to work effective and efficiently have not been there, proven that it has to done through a service provider, I think, through a medical facilities or through schools that has a basis for sharing this information” (Chris).
“They have this program, ummm…Just Move It thing” (Eldon).

“Teach them (unclear words) or even like, like uhh…uhh, think like at that walk, walk in area...” (Clinic waiting areas) (Fred).

“Classes” (Gordon).

Some of the participants identified that education on heart disease would be beneficial through reading and listening, such as through books, flyers, and radio or television programs (5 of 9).

“The book that they gave me, yaah, that..that..that helps, too. It’s got a lot of graphics, a lot of information” (Abel).

“A lot of the older generation, they prefer the old style of broadcast, which is KTNN, KYAT out of Gallup, the new one. You know, there is a variety of...ahhh...television stations that a lot of older generations...ahh...listen to” (Chris).

“KTNN radio” (Dean’s wife).

“Ahhh, you gonna have to put up flyers or do so…some kind of ummm…what do you have out there? Ummm, like a booth out there, or something. To give out papers, information and….what…what they eat and everything” (Ivan).

The Navajo Nation radio station, KTNN radio was mentioned by Dean’s wife as a good way to educate others about heart disease and its risk factors. Several of the participants described social gatherings where Native Americans congregate as places to educate others on heart disease (4 of 9).

“Now the older generation, they’re out of school, and so forth, their habits and patterns and styles have already set in, so I think much of it has to be done through….where do they gather? Where do they congregate? Chapter house is one...only one of the few ways. But predominately, where do they gather? Ceremonies. Gatherings, song and dances. Pow-wows. That’s where they need to get their heart checked. Or at a song and dance or at a Yei be cheii or at a Squaw dance” (Chris).

“Probably at, just like people where..where the people get together” (Fred).

“…ummm, like a swap meet and everything, kinda like a booth and put all these like…what not to eat and what to eat” (Ivan).
Domain 2: Perceptions of Barriers or Facilitators that Influenced Treatment Seeking Behaviors

This section addresses research question two: What are the perceptions of what were barriers or facilitators that influenced treatment seeking behaviors? Two major themes were identified: 1) Seeking Treatment and 2) Access to Health Care. These two major themes explain the participants’ perceptions and descriptions of barriers and facilitators that influenced treatment seeking behaviors.

Theme: Seeking treatment. The theme, Seeking Treatment, was derived through commonalities identified in data. Two categories emerged from this theme: 1) Influences to Not Seeking Treatment and 2) Influences to Seeking Treatment.
FIGURE 2. Perception of Barriers or Facilitators that Influenced Treatment Seeking Behaviors.

The first category, *Influences to Not Seeking Treatment*, emerged from the subcategories 1) *Ignoring symptoms*, 2) *I thought it was going to go away*, and 3) *I didn’t think it was my heart* (Figure 2). The subcategories emerged from the participants’ perceptions of what influenced them to not seek treatment for their symptoms. The prodromal and acute symptoms these participants described were discussed in the ACS Symptom Experience. These subcategories describe how they acted on these symptoms. Participants described continuing to work or go about their activities rather than seeking treatment promptly, despite having significant symptoms (5 of 9).
“It’s like an indigestion sensation and at the same time I started sweating. Aadoh (translation: and), I vomited all that water that I..that I drank..the whole bottle if it before I started to get dehy..get hydrated..that..that came back out and I sa..i sat down..umm..probably about 15 minutes, daats’ii (translation: I think) and that’s..that’s the..it went away. So I..I’m like I..I quit sweating..I didn’t..I didn’t feel like normal you know [inaudible], back to my normal self. So we drove to..to move the truck up and we found another log and started cutting..umm..probably the 3rd one down the..the..the pain was enough to drop me. I just dropped the chain saw and..and then..and I couldn’t stand up like, and the same thing happened, it’s like it..indigestion sensation, nahalooh (translation: it feels like) and I started to vomit again and I laid down but that didn’t help, I..I kept walking around. We still kept cutting wood for about another 20 minutes” (Abel).

“So I went over there doing the shoveling for about two hours, that’s when I feel that pain. It’s when they call me over there..over to eat. So I just went back over there. Soo, after that we ate and then after three hours we went back to the house, to our house then I feeling the pain going up on my back, my arm, kind of hurt right here (gestures to right arm, shoulder and upper back), kind of numb up here (points to chin), kind of go like this (gestures across chest)” (Dean).

“Then I…I just started walking around and I tried walk it off and then I tried do things and see if I work on something it would go away but it seems like it just stays there. Doesn’t, doesn’t go away and I finally, I don’t know, around about towards the noon or somewhere around that time, I thought of it and said I better go check myself in and get check out and see what’s going on” (Fred).

Two other participants ignored their prodromal symptoms.

“Actually I felt this pain about a year ago. It’s been there for about over a year. Off and on, it just go away and go away and go away and come back and go away” (Brian).

“Before the day of my episode, prior to that, maybe a month or two, I noticed that my coordination was the diminished, my balance was diminished, ummm, I having a little problem walking, maintaining balance, umm, my vision was sort of blurred...” (Chris).

Some participants delayed seeking treatment because they thought their symptoms would resolve (3 of 9).

“I thought it was just gonna go away. Then I…I just started walking around and I tried walk it off and then I tried do things and see if I work on something it would go away but it seems like it just stays there” (Fred).

“I thought it was gonna go away but...” (Gordon).
Over half of the participants did not seek prompt treatment because they did not attribute their symptoms to their heart (6 of 9).

“So I’ve got…I’ve got asthma, also. So I thought, that was part of it” (Abel).

“I thought it was heartburn. Nah, I didn’t think it was my heart” (Brian).

“I thought it was asthma” (Chris).

“I thought I was just sore when I doing the shoveling” (Dean).

“I wasn’t even thinking that. It was hurting, right here in my shoulder (gestures to his shoulder). Thought it was because of that (a recent surgical procedure), but it wasn’t” (Gordon).

“Aaah, wouldn’t go away so I started to…took a aspirin, ahh, what else I took, ahh. It helped a little but then when I went back to bed, it flared up again. Ahhat was pain. I thought it was like heartburn. And that went away quick, after the pills” (Ivan).

The second category, *Influences to Seeking Treatment*, emerged from the subcategories 1) *Symptoms worsened or didn’t resolve*, 2) *Family influence*, and 3) *This is serious* (Figure 2). The subcategories emerged from the participants’ perceptions of what influenced them to seek treatment for their symptoms. Almost all of the participants described worsening or non-resolving symptoms as major influences to seeking treatment (8 of 9).

“But lately in the last 3 to 4 months I noticed it was getting more and more pronounced, but that day it happened, it happened during the afternoon…and it wouldn’t go away at all, until the time I went to the hospital” (Brian).

“So I was experiencing that and I kept taking this albuterol and it..it wasn’t clearing my heart pressure and stuff like that, and little bit in the afternoon, at one o’clock or there abouts…I ahhh…I ahhh..I started getting an upset stomach…ahhh…like gas but ahhh..finally I..I need fresh air. ahhh I walked out even in the rain and snow. I was outside walking around and then it was that time I…I started to throw up. I started vomiting. This was around 3:30, there abouts and I kept vomiting, and then the pain in my heart really became acute at that point. But then as I started to vomit the pain migrated up towards my left shoulder area, in that region. I kept using that albuterol hoping that it was indigestion and so forth. And that thought came to mind when I
started...wasn’t getting any relief of my discomforts and so forth. It was then I thought now I better make other arrangements to get to the hospital” (Chris).

“...it seems like it just stays there. Doesn’t, doesn’t go away and I finally, I don’t know, around about towards the noon or somewhere around that time, I thought of it and said I better go check myself in and get check out and see what’s going on” (Fred).

“Na uhh, it got worse, then went to hospital” (Gordon).

“... before I got to my home I felt stronger pain and I asked him just to take me to the hospital” (Harry).

“I said, oh man, this is gotta go away. I took some aspirin, it didn’t help. And I started up the truck and I was planning to leave then I almost passed out. And I knocked on my brother’s door and he took me to the hospital” (Ivan).

Along with worsening or non-resolving symptoms, some participants described that family and past experiences influenced them to seek treatment (5 of 9). Influences to seek treatment came from wives, a girlfriend and a daughter. One participant described his friend having almost the same symptoms as he did and because if this, he decided to go to the hospital.

“I had a real close friend, an older gentleman that I knew well, years back. he...he ahhh, he died in a Hozhohiji (translation: Blessing Way) ceremony, or was that a Kinaaldah (translation: young girl coming of age) ceremony. He was sitting on the south side but during the day he kept saying that he had an upset stomach and that he wasn’t well and he didn’t know he had...was having a heart attack. He died there at the hogan in the ceremony...He was asthmatic, too, that I knew. And he died. And that thought came to mind when I started...wasn’t getting any relief of my discomforts and so forth. It was then I thought now I better make other arrangements to get to the hospital. So, despite the weather and everything else, that’s when I told my wife, let get out here, I’m having a heart attack here” (Chris).

Three participants felt something was not right or that this was serious also contributed to their seeking treatment.

“And finally I said you know this..this..this doesn’t feel right..that doesn’t..there’s something else going on...let’s go, bedishnooh (translation: I told them)... and that’s when we left” (Abel).

“I told my wife, let’s get out here, I’m having a heart attack here. Yes, this is serious kind of thing” (Chris).
The feeling that something was wrong is why Gordon’s wife kept checking on him periodically. She kept asking him what was wrong and when he finally told her that his chest was hurting, they went to the emergency department.

**Theme: Access to health care.** The theme, *Access to Health Care*, was derived through commonalities identified in the open coding of data where participants described their experience with access to health care. Two categories emerged from this theme: 1) *Flown/Transferred Out* and 2) *Challenges to Emergency Department Access* (Figure 2).

The first category, *Flown/Transferred Out*, emerged from participants’ description of being transported from the health care facility on the reservation to a PCI-capable facility. There are no PCI-capable facilities on the Navajo or Hopi reservations which results in having to be flown or transferred out to PCI-capable facilities off the reservations. Timely access to health care (PCI-capable facilities) is not available to Native American patients who are having an acute myocardial infarction and reside on the Navajo and Hopi reservations. All but one of the participants resided on the reservation and being transferred out by air transport was a significant event for them. Six of nine participants described having to be transported out by air. At the time of their heart attacks they were seen at a rural emergency department and had to be transferred out to a PCI-capable hospital.

“So I will be flying out to Phoenix, that time they were saying Phoenix, and another 15 minutes they said that going to I was going to Flagstaff” (Dean).

“And they rush me up there in the helicopter. Ummm, they were waiting for me over here. The doctor was already there” (Eldon).

“So I just go on the chopper. But I…I got up over there, and then they were talking to me, they, they were sending me off in chopper and all that..so is, so is, the..they just ask me if it was okay for me to fly, I said, yeah, just go ahead, do what you have to do, so they got me into the chopper and brought me here” (Fred).
“... and the next I knew, I was unloading in Phoenix. I...they were taking me out of the helicopter in Phoenix. And that was it” (Harry).

“And there they said yeah, I have a heart attack. And they flew me out here” (Ivan).

The second category, Challenges to Emergency Department Access, emerged from the subcategories: 1) Locale and sporadic or no cell/phone service (Figure 2). The subcategories were inductively coded from the participants’ description of their experiences to the challenges they encountered while seeking treatment. Participants described challenges to health care access due to locale (3 of 9) and poor cell phone service (2 of 9). Locale pertains to environmental conditions and long distances to the nearest emergency department.

“We were home the day of the episode. It was raining and snowing and real blisterly condition and we weren’t doing anything, nothing strenuous or stressful. We were just there because of...we were locked in because of the weather. So, despite the weather and everything else, that’s when I told my wife, let get out here, I’m having a heart attack here. Chinle is like 50 miles. Yeah, and I drove out of the...through the mud and snow and everything else” (Chris).

“Just ahhh...just the drive time to get there. Auhhhh, I live by...by the Grand Canyon, so that’s about...that’s almost about an hour and 45 minute drive” (Abel).

Eldon, one of the participants recounts his journey to the emergency department in Tuba City and also mentions cell service going “off and on.” The distance from his home in Navajo Mountain is approximately 94 miles one way.

“Navajo Mountain, Southern Utah. We have a house, three bedroom, running water, electricity. We were down there for the...for the eve...couple of nights when we’re driving back up here, just past the state line. I was driving, I said...ahhhh, I...I feel numbness in my hand, I told her. And then I says ahhh, I..I can’t hardly breathe, so...so she said, you want me to drive, she says. Ahhhhhh, I think you should. So I pull off the road and she starts to drive. And I laid back, roll down the window, it was cloudy, it was cloudy, it was nice cool out there. Ahh, ahhh, when that breeze, air was coming through the window, I was pulling back..laying down, I was still sweating and she says I want to call the ambulance she says. I’m going to call the ambulance. Go ahead, I told her. And we drove like...for like 10 miles. And then she call the ambulance and we pull off the road to call the ambulance cuz when we drive out...out there, the signal goes off and on.
anyways, she called and they told us to kind of [unclear word] driving. Have our lights flashing and we..they going to meet us..and they will meet us in about 15 miles out, towards Inscription House” [Inscription House is a small community on the Navajo reservation].

Chris’ story is similar, in which he tells about the symptoms beginning in the morning and lasting all day. He drove from his home in Low Mountain to Chinle emergency room, which is approximately 59 miles one way. He also describes having to find a “cell reception area.”

“And that thought came to mind when I started..wasn’t getting any relief of my discomforts and so forth. It was then I thought now I better make other arrangements to get to the hospital. So, despite the weather and everything else, that’s when I told my wife, let get out here. I’m having a heart attack here. Yes, this is serious kind of thing. Yeah, but on the way in, when we got into a cell reception area, I had called ahead... To let them know I was coming in and I was having these symptoms, and so forth. So when I got there, they were waiting for me and they pulled me right into ER.”

**Quantitative Results**

**Domain 3: Symptoms of ACS Measured by MAPMISS Questionnaire**

**Prodromal symptoms.** Prodromal and acute symptoms of ACS felt by Native American adult males were examined using the MAPMISS Questionnaire. The MAPMISS Questionnaire was administered to study participants to answer research question three: What symptoms of ACS, as measured by the MAPMISS Questionnaire, occurred in these Native American adults?
TABLE 2. Acute Location of Pain or Discomfort (N=9)

<table>
<thead>
<tr>
<th>Acute Location of Pain or Discomfort</th>
<th>Frequencies</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neck/throat</td>
<td>4</td>
<td>44.4</td>
</tr>
<tr>
<td>Generalized chest</td>
<td>3</td>
<td>33.3</td>
</tr>
<tr>
<td>Top of shoulders</td>
<td>3</td>
<td>33.3</td>
</tr>
<tr>
<td>Centered high in chest</td>
<td>2</td>
<td>22.2</td>
</tr>
<tr>
<td>Left breast</td>
<td>2</td>
<td>22.2</td>
</tr>
<tr>
<td>Jaw/teeth</td>
<td>2</td>
<td>22.2</td>
</tr>
<tr>
<td>Back, between/under shoulder blades</td>
<td>2</td>
<td>22.2</td>
</tr>
<tr>
<td>Both arms</td>
<td>2</td>
<td>22.2</td>
</tr>
<tr>
<td>Right arm or shoulder</td>
<td>2</td>
<td>22.2</td>
</tr>
</tbody>
</table>

Over half of the participants (5 of 9) reported prodromal symptoms with the average number of 3.22 ± 5.24 (range 0-16) prodromal symptoms reported. The prodromal score weighted by frequency and intensity, averaged 27.11 ± 60.11 (range 0-186). Two participants reported chest pain or discomfort more than one month prior to their heart attack: one centered high on the chest (severe) and the other mid-lower chest (medium). General symptoms most frequently reported were very tired/unusual fatigue (4 of 9), anxious (2 of 9), shortness of breath/orthopnea (2 of 9), and new onset of vision problems (2 of 9). Three out of the five participants reporting prodromal general symptoms had these symptoms for more than a month prior to their heart attack.

**Acute symptoms.** All of the participants (9 of 9) reported acute symptoms on the day of their heart attack, which the average number of 10.44 ± 6.06 (range 2-21). The acuity score
weighted by intensity, averaged 25.56 ± 15.45 (range 5-56). The most reported location of acute pain or discomfort were neck/throat (4 of 9) with 33.3% rating as severe, generalized chest (3 of 9) with 33.3% rating as severe, and top of shoulders (3 of 9) with 33.3% rating as severe. Acute general symptoms most frequently reported were shortness of breath/difficulty breathing (7 of 9) with 55.6% rating as severe, indigestion (6 of 9) with 44.4% rating as severe, nausea (5 of 9) with 33.3% rating as severe, hand/arm tingling (5 of 9) with 44.4% rating as severe, new vision problem (4 of 9) with 22.2% rating as severe, cold sweats (4 of 9) with 22.2% rating as mild, and felt weak (4 of 9) with 22.2% rating as medium. Over half of the participants (6 of 9) reported changes in short-term memory compared to one year before their heart attack. The average time from symptom onset to hospital presentation was 7.42 ± 7.69 hours (range 1.5-24.5).

**TABLE 3. Prodromal and Acute General Symptoms (N=9)**

<table>
<thead>
<tr>
<th>Prodromal General Symptoms</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Acute General Symptoms</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very tired/unusual fatigue</td>
<td>4</td>
<td>44.4</td>
<td>Shortness of breath/difficulty breathing</td>
<td>7</td>
<td>77.8</td>
</tr>
<tr>
<td>Anxious</td>
<td>2</td>
<td>22.2</td>
<td>Indigestion</td>
<td>6</td>
<td>66.7</td>
</tr>
<tr>
<td>Shortness of breath/orthopnea</td>
<td>2</td>
<td>22.2</td>
<td>Nausea</td>
<td>5</td>
<td>55.6</td>
</tr>
<tr>
<td>New onset of vision problems</td>
<td>2</td>
<td>22.2</td>
<td>Hands/arms tingling</td>
<td>5</td>
<td>55.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>New onset ofvision problems</td>
<td>4</td>
<td>44.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cold sweat</td>
<td>4</td>
<td>44.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Felt weak</td>
<td>4</td>
<td>44.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Very tired/unusual fatigue</td>
<td>3</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Heart racing</td>
<td>3</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Vomiting</td>
<td>3</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Arms weak/heavy</td>
<td>3</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Arms ache</td>
<td>3</td>
<td>33.3</td>
</tr>
</tbody>
</table>

**Summary**

In chapter four, the data analysis findings from the semi-structured interviews, demographic questionnaires and MAPMISS questionnaires were presented. Participants provided rich data containing their personal experiences and perceptions of their AMI experience
and their perceptions of barriers and/or facilitators to seeking treatment. MAPMISS provided valuable information on the prodromal and AMI symptoms in this subgroup of Native American adults residing in northern Arizona. Themes of Heart Attack Symptoms, Heart Disease Awareness, Seeking Treatment, and Access to Health Care emerged from the data and provided answers to the three research questions that guided this study.
CHAPTER FIVE: DISCUSSION OF FINDINGS

The purpose of this DNP project is to describe the ACS experience among Native American adults who reside in northern Arizona and were diagnosed with an AMI. The results of this study will assist health care professionals in identifying potential barriers to seeking prompt treatment for symptoms of ACS and developing a culturally-sensitive, community-based education program directed toward the Native American population to increase awareness of ACS symptoms. In this chapter, the findings were discussed and interpreted. Study strengths and limitations were reviewed and implications for further research were given. The research questions that guided this study were:

1. How does this subgroup of Native Americans perceive and describe their ACS symptom experience?
2. What are the perceptions of the barriers and/or facilitators that influence treatment seeking behaviors among this subgroup of Native Americans?
3. What are the self-reported prodromal and AMI symptoms, as measured by the MAPMISS questionnaire, in this subgroup of Native Americans?

Native American Adults as a Vulnerable Population

The review of literature revealed Native Americans experience lower health status, lower life expectancy and a disproportionate disease burden compared to U.S. all races population (Go et al., 2013; IHS, 2015a). They also experience higher mortality and morbidity rates from heart disease, diabetes, cerebrovascular disease and other disease states (IHS, 2015a; Kochanek et al., 2011; Rhoades, 2005; Rhoades et al., 2007). The high incidence of coronary heart disease has been attributed to the increased prevalence of CVD risk factors in this population (Barnes, et al.,
High poverty rates, high unemployment rates, poor socioeconomic status, limited access to health care, and low education levels contribute to health disparities in this vulnerable population. The demographic findings from this study reinforce what has been found in the literature.

In this study, all the participants currently live on reservations and receive their health care from IHS facilities. Of the nine participants, only one had a college degree. Seven had a yearly income of $39,000 or less and of those seven, three earned less than $10,000 a year. This is below the 2013 median household income of $52,250 for the U.S. and $48,510 for Arizona (Noss, 2014). None of these participants was receiving disability benefits but over half had some type of health insurance (private [3 of 9] or Medicaid [4 of 9]). Treatment delay has been attributed to those with low income (less than $33,533 annually) and being a Medicaid recipient (Foraker et al., 2008). All participants had at least one or more CVD risk factors present before their heart attack. The most prevalent were high blood pressure (6 of 9) and diabetes (5 of 9). In the literature, hypertension and diabetes were prevalent in Native American populations (Blackwell et al., 2014; Cobb et al., 2014; Howard et al., 1999; Jernigan et al., 2010; Kurian & Cardarelli, 2007; Rhoades, 2005; Rhoades et al., 2007). Average BMI for the participants in this study was 27.08 kg/m², which is classified as overweight by Centers for Disease Control (CDC) standards (CDC, 2015). This was the first heart attack for all participants at an average age of 58 years. This is lower than the average U.S. population rate of 65 years old at first heart attack for men and 75 years old for women (Mozaffarian et al., 2015). An important finding was the average time from symptom onset to presentation to the hospital was 7.4 hours. Average time
from symptom onset to hospital presentation, nationally, ranges from two hours to five hours and has not changed significantly over the years (Miller, 2010; Mozaffarian et al., 2015; Saczynski et al., 2008; Ting 2010). Social, cognitive and emotional factors, as well as the vulnerability of this population contribute to delay in seeking treatment (Devon et al., 2010; Foraker et al., 2008; McSweeney et al., 2010, Moser et al., 2006; Saczynski et al., 2008; Zerwic et al., 2003).

The ACS Symptom Experience

The two major themes of *Heart Attack Symptoms* and *Heart Disease Awareness* explain the participants’ perceptions of their ACS experience.

**Heart Attack Symptoms**

Racial and ethnic variations in myocardial infarction symptoms have been studied, but few have focused on Native Americans. Of the studies from the literature review, McSweeney et al. (2010) looked at prodromal and acute MI symptoms in non-Hispanic whites, African Americans, and Hispanics but not Native Americans. In the populations studied by McSweeney et al. (2010), the most frequently reported prodromal symptoms were unusual fatigue, sleep disturbances and anxiety and the most reported acute symptoms were shortness of breath any chest pain/discomfort, and weakness, (McSweeney et al., 2010). In the other study, First Nations patients were more likely to report mid-sternal pain/pressure, shortness of breath, arm pain, nausea, vomiting, syncope, and confusion with their initial presentation of an AMI (King et al., 2009). The participants in this current study were all Native American men (eight Navajo and one Hopi). In the interviews, two participants reported prodromal symptoms consisting of intermittent heart burn, diminished coordination and balance, blurry vision, and poor sleep. In comparison with the MAPMISS, three more participants reported prodromal symptoms. Two
participants reported prodromal pain or discomfort on the MAPMISS questionnaire: centered high on the chest, mid-lower chest, neck/throat, jaw/teeth, back, between/under shoulder blades, top of shoulders and both arms. On the MAPMISS questionnaire, the most common prodromal general symptom was very tired/unusual fatigue. Prodromal symptoms were briefly mentioned in two of the interviews but more participants reported prodromal symptoms on the MAPMISS Questionnaire. This may be due to the PI being a novice researcher and inexperience with conducting interviews and remembering to ask open-ended questions and additional probing questions to elicit more stories about the participants’ heart attack symptoms. The MAPMISS findings expanded on the prodromal symptoms mentioned in the interviews. The prodromal symptom of very tired/fatigue in the MAPMISS findings of this study was also present in the minority women of the McSweeney et al. (2010) study. While the participants in this study were all male, the commonality between the McSweeney et al. (2010) study, and this study was that both groups were minorities.

All participants in this study described acute symptoms during their interviews, with the most frequent ones being chest pain, increasing discomfort, altered level of consciousness, gastrointestinal symptoms (vomiting, heartburn, indigestion), shortness of breath, and sweating. These acute symptoms reported in the MAPMISS were similar: chest pain, shortness of breath, gastrointestinal symptoms (indigestion, nausea), hands/arms tingling, new onset of vision problems, and cold sweat were common symptoms being reported. Neck/throat, generalized chest and top of shoulders were most frequently reported areas of acute pain or discomfort. The majority of the participants attributed their symptoms to either heartburn, indigestion or asthma and this was again identified in the MAPMISS questionnaire. Therefore, in this subgroup of
Native American men, heartburn, indigestion and asthma were frequently thought of as the cause of the symptoms they were experiencing during their heart attack. Another finding was that over half of the participants reported changes in short-term memory compared to one year before their heart attack. This may be due to ischemic brain injury, critical illness, age, disease severity at baseline, neuroinflammatory processes, systemic issues (hypotension, hypo- or hyperglycemia) and presence of risk factors prior to AMI (diabetes mellitus and/or hypertension) (Lilja et al., 2015; Cronberg et al., 2015). Patient and family education should include short-term memory loss as a possible symptom encountered after a heart attack.

**Heart Disease Awareness**

Almost all of the participants had little knowledge of heart disease and its risk factors prior to their heart attacks. They attributed this to not educating themselves or not being educated by health care providers. Responses included “not paying attention,” “not educating myself” or “they never told us” about heart health. The results of the literature review revealed little research on Native American risk factor awareness. While two studies, mentioned previously, reported high CVD risk factor awareness among Native Americans (Oser et al., 2006; Schweigman et al., 2006), the participants of this study had a low level of CVD risk factor awareness. On the other hand, ACS symptom awareness was low in this subgroup of Native American men. The findings from this study identified low education level, low household income, and lower socioeconomic status to be present in these Native American male participants. These vulnerabilities contributed to low ACS symptom awareness, and likely low CVD risk factor awareness in this subgroup of Native American men. Prior studies have found that ACS symptom awareness was significantly lower in socioeconomically disadvantaged and
minority groups than in non-Hispanic whites (Greenlund et al., 2004; King et al., 2009; McGruder et al., 2008). Low ACS symptom awareness was also found to be prevalent in men and those having less education (Greenlund et al., 2004; McGruder et al., 2008).

The “Not Me” and “I was Healthy/Active” concepts were also prevalent. The participants found it difficult to believe that a heart attack could happen to them. This could likely be from their perceptions of having an active or healthy lifestyle prior to their heart attack, that it only happens to other people, and that it could not happen to them. Limited knowledge of CVD risk factors may be due, in part, to the “not paying attention” and “not educating myself” perceptions, in addition to the “not me” way of thinking.

How do we teach others? When asked what they felt would be the best approach to teach other Native Americans about heart disease and its risk factors, the majority of the participants felt that this should be taught by health care providers. Participants felt that education should begin at an early age and taught throughout the years. Common recommendations for where health education to take place were at social gatherings and where people congregate. These settings include the weekly swap meet, which takes place in several reservation communities on the weekends, and cultural ceremonies (song and dances, pow-wows). Other suggestions were to broadcast on local radio stations in their native language.

Perceptions of Barriers or Facilitators that Influenced Treatment Seeking Behaviors

The two major themes of Seeking Treatment and Access to Health Care explain the participants’ perceptions of barriers or facilitators influencing treatment seeking behaviors.
Influences to Not Seeking Treatment

Despite having symptoms such as severe chest discomfort, altered level of consciousness, diaphoresis, nausea, vomiting, and shortness of breath, participants described continuing to go about their activities rather than seeking treatment. Explanations for this could be ignoring symptoms, thinking the symptoms would resolve, or thinking it was something other than the heart. Over half of the participants did not attribute their symptoms to the heart and thought it was an asthma exacerbation, indigestion, heartburn, or due to a prior surgical procedure. Factors that have been contributed to delay in seeking treatment for ACS symptoms were being of minority race, low income, having Medicaid or no insurance, presence of heart disease risk factors, not attributing symptoms as cardiac, waiting for symptoms to subside, and having intermittent symptoms (Devon et al., 2010; Foraker et al., 2008; Moser et al., 2006; Saczynski et al., 2008; Zerwic et al., 2003). These factors were present in the Native American male participants of this study. Cultural influences such as family responsibilities taking precedence over oneself, ceremonial/religious obligations, viewing illness as an imbalance in life or disruption of harmony, and not placing attention on oneself may also play a part in not seeking prompt treatment for heart attack symptoms. One participant was clearing a rain-damaged road so it would be accessible to family arriving for a family gathering. Another participant was participating in a religious ceremony and did not seek treatment until the ceremony was over. Another was chopping and gathering wood to prepare for the winter.

Influences to Seeking Treatment

Major influences to seeking treatment in this population were worsening or non-resolving symptoms, the seriousness of the situation and a feeling that something was not right. When
medications, activity, or fresh air did not resolve symptoms or when symptoms worsened, participants realized that they needed to seek treatment. Family and past experiences were also major influences in seeking treatment. For both the Navajo and Hopi, family and religious obligations take precedence over everything else and may influence treatment seeking behaviors. These findings give insight in what were major influences to seeking treatment and can help health care providers gain a better understanding of treatment seeking behaviors in this population.

**Access to Health Care**

The Navajo reservation is the size of West Virginia and spans 27,000 square miles (Navajo Nation Government, 2011). The Hopi reservation lies within the borders of the Navajo reservation and covers 3,500 square miles (Hopi Tribe, 2013). None of the health care facilities on these reservations is PCI-capable and all patients needing percutaneous interventions, per ACCF/AHA guidelines, are transported off the reservations to PCI-capable health care facilities. These PCI-capable facilities are more often over a hundred miles away and require air transport in order to meet door to needle times for ACS patients. All but one of the participants in the study were flown from reservation hospitals to a PCI-capable facility. This was a significant event for them and it was brought out in their stories.

Accessing health care was difficult for almost all participants and contributed to treatment delay. This was evidenced by the distances the participants travel to the nearest health care facility. In this study, this average distance was 19 miles. It is important to note that not all health care facilities have emergency departments that are equipped to handle ACS emergencies, thus making the distance traveling to one that can even further. For Eldon, the nearest health care
facility was the Inscription House Clinic (39 miles) which closed at five o’clock on weekdays and is closed on weekends (IHS, n.d.). He then had to go to Tuba City Regional Health Care which is 94 miles from his home in Navajo Mountain. For Chris, the distance from his home to the nearest emergency department was almost 60 miles. Abel describes his distance as “about an hour and 45 minute drive.”

Other barriers that the participants in this study encountered were poor weather conditions and having to find areas of cell phone service so they could call ahead to the emergency department. The Navajo word for cell phone is bił níjoobali, which literally means “something you use while spinning around in circles.” This phrase is a description of someone spinning around with a cell phone, trying to get good reception. Poor cell reception is part of life on both the Navajo and Hopi reservations and this presents a communication barrier with emergency services. A little over 50% of the Navajo reservation has wireless broadband coverage through 3G but only 37% of the population have cell phones (Landry, 2013). The Navajo reservation (which includes the Hopi reservation) covers approximately 31,000 square miles and many Navajo and Hopi people live in extremely rural and remote areas without timely access to health care facilities. Approximately 76% of the roads on the Navajo reservation are dirt and unpaved and become almost impassable during inclement weather (Armao, 2014). These stories bring into perspective the barriers encountered when trying to access emergency health care services on the reservation.

**Complimentarity**

In this study, there were some similarities of prodromal and acute symptoms described by these participants in both the interviews and MAPMISS questionnaire (Table 4). These
similarities included chest pain/discomfort, shortness of breath, indigestion, nausea, vomiting and diaphoresis. Complimentarity provided enhancement and clarification to the results from the Semi-structured interviews and the MAPMISS questionnaire. In the MAPMISS questionnaire, participants reported “severity of pain” and “the symptoms did not go away” as reasons for seeking treatment. The interviews provided rich data describing the severity and unrelenting nature of the symptoms the participants were experiencing and provides a more meaningful interpretation. MAPMISS data provided the average time from beginning of symptoms to arrival at hospital. The interviews provided enhancement and clarification on why it took several hours: influences on treatment seeking behaviors, locale and difficulties in accessing health care. The MAPMISS questionnaire provided clarification of prodromal symptoms, with more participants reporting prodromal symptoms in the MAPMISS than in the interviews.
TABLE 4. Comparison of AMI Symptoms Between Methods.

<table>
<thead>
<tr>
<th>MAPMISS Results</th>
<th>Semi-Structured Interview Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid lower chest pain discomfort</td>
<td>&quot;I thought it was heartburn... Actually I felt this pain for about over a year&quot; (Brian).</td>
</tr>
<tr>
<td>Sleep disturbance</td>
<td>&quot;Before the day of my episode, prior to that, maybe a month or two, I noticed my condition was those were my balance was diminished, umm, I have a little problem walking, maintaining my balance, umm, my vision was sort of blurred... I wasn’t sleeping well&quot; (Chris).</td>
</tr>
<tr>
<td>New vision problem</td>
<td></td>
</tr>
<tr>
<td>Diminished balance coordination</td>
<td></td>
</tr>
<tr>
<td>Chest pain discomfort</td>
<td>&quot;The pain in my heart really became acute at that point&quot; (Chris).</td>
</tr>
<tr>
<td>Shortness of breath</td>
<td>&quot;I went to sleep, then ahh, ahh, that’s Monday morning. Then, ahh, ahh, got up with my chest pain like 9:30 or 10&quot; (Fred).</td>
</tr>
<tr>
<td>Indigestion/pause/vomiting</td>
<td>&quot;He said his chest was hurting&quot; (Gordon’s wife).</td>
</tr>
<tr>
<td></td>
<td>&quot;And then I says ahh, I can’t hardly breathe&quot; (Eldon).</td>
</tr>
<tr>
<td></td>
<td>&quot;ummm, in the morning when I got up, I noticed that he wasn’t breathing too well&quot; (Gordon’s wife).</td>
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<tr>
<td></td>
<td>&quot;I just dropped the chain saw and, and then...and I couldn’t stand up like, and the same thing happened, it’s like an indigestion sensation&quot; (Abel).</td>
</tr>
<tr>
<td></td>
<td>&quot;I started getting an upset stomach... ahh, ahh, gas but ahh, finally I need fresh air. ahh, I walked out even in the rain and snow. I was outside walking around and then it was that time. I started to throw up. I started vomiting&quot; (Chris)</td>
</tr>
</tbody>
</table>

Influence to Seeking Treatment

| Severity of pain                          | "But lately in the last 3 to 4 months I noticed it was getting more and more pronounced, but that day it happened, it happened during the afternoon... and it wouldn’t go away at all, until the time I went to the hospital" (Brian). |
| Symptoms did not go away                  | "I started vomiting. This was around 3:30, thereabouts and I kept vomiting, and then the pain in my heart really became acute at that point. But then, as I started to vomit the pain migrated up towards my left shoulder area, in that region, I kept using that all the while hoping that it was indigestion and so forth. And that thought came to mind when I started... wasn’t getting any relief of my discomforts and so forth. It was then I thought now I better make other arrangements to get to the hospital" (Chris). |
|                                           | "Then I... I just started walking around and I tried walk it off and then I tried doing things and see if I work on something it would go away but it seems like it just stays there. Doesn’t, doesn’t go away and finally, I don’t know, around about towards noon or somewhere about that time, I thought, ‘oh, and I better go check myself in and get check out and see what’s going on’ (Fred). |
|                                           | "At night when we all lay down after practice, we lay down around 1 o’clock. So one of the volunteer drop me off at my house but before I got to my house I felt stronger pain and I asked him, just to take me to the hospital" (Harry). |
|                                           | "I said, oh man, this gotta go away. I took some aspirin, it didn’t help. And I started up the truck and I was planning to leave then I almost passed out. And I knocked on my brother’s door and he took me to the hospital" (Ivan). |
**Strengths and Limitations**

The strength of this study was its use of a mixed methods design, which emphasized a qualitative view of the research process with the quantitative results informing the qualitative results of the phenomenon under study (QUAL→quan). This mixed methods design incorporated the study participants’ views in the research process, thus placing the study participants as partners in the research process and transitioning from “research ‘on them’ to ‘with them’” (Marti & Mertens, 2014, p. 208). The mixed methods approach works well when studying vulnerable populations because it gives researchers a deeper and more complete understanding of social and cultural aspects of the phenomenon of interest (Apesoa-Varano & Hinton, 2013). This integrative method provided rich data containing participants’ personal experience, perceptions and descriptions of ACS and their perceptions of barriers or facilitators influencing treatment seeking behaviors. The semi-structured interviews facilitated storytelling, which is how important information is communicated and passed on in Native American cultures. The interviews allowed for participants to tell their stories of their ACS experience in a way they were most comfortable. The qualitative descriptive method provided results close to the participants’ personal experiences and will assist in the development of culturally sensitive programs to increase ACS symptom awareness in the Native American population. The quantitative portion enhanced and clarified what was told in the participants’ stories.

There were several limitations in this study. In regards to sample size, this would not be a limitation for the qualitative portion since data saturation was achieved, but would be for the quantitative portion of this study. Studies with larger sample sizes are needed to find out if there are additional symptoms or descriptors Native American adults use to describe their ACS...
experiences and for generalizability of the findings. Nine of the participants of this study were Navajo and one was Hopi, so findings may not represent other Native American tribes. All the participants were male, thus limiting transferability of study findings to Native American women. Another limitation involved the problems the researcher experienced with patient recruitment. The sample of participants were limited to those who were able to make it to their interviews in Flagstaff. Long distances and personal obligations resulted in many potential participants not keeping their interview appointments. Larger studies with both men and women from several Native American tribes are needed to provide a more complete understanding of the ACS symptom experience in the Native American population.

**Practice Implications and Recommendations**

The findings of this study provide insight into the ACS experience of Native American adults in northern Arizona. The role of an advanced practice nurse would be to lead the way in developing programs, not only to educate health care providers, but also Native American communities on ACS symptom awareness. Knowledge of the ACS experience for this population strengthens the ability of advanced practice nurses to design and implement culturally-sensitive education programs directed toward the Native American population. Based on findings from this study, education on ACS symptoms and the importance of seeking early treatment should be done by health care providers and started with the children and continued throughout the years. Education should take place at social gatherings or on local radio stations in Native languages. Having heart attack survivors share their experiences and insights through storytelling, offering nutritional and healthy cooking classes at local swapmeets or social gatherings, and providing information on heart attack symptoms in Native languages are a few
ideas on culturally-sensitive ways to educate Native American communities. Education and interventions that are community-based and culturally tailored have been found to be successful in decreasing risk factors for diabetes type two (Vincent, McEwen, Hepworth, & Stump, 2014), improving diabetes mellitus knowledge (Brown & Hanis, 1995), and improving outcomes for knowledge and awareness of CVD (Altman, Nunez de Ybarra, & Villablanca, 2014) in vulnerable populations.

ACS symptom awareness education should include very tired or unusual fatigue as a prodromal symptom for ACS. The acute symptoms of pain or discomfort (neck/throat, generalized chest discomfort, top of shoulders), shortness of breath, gastrointestinal symptoms (indigestion, heartburn, nausea), hands/arms tingling, new onset vision problems, or cold sweat need to be included in ACS symptom awareness education for Native American men. Education on CVD risk factors is a crucial component in ACS symptom awareness education. Awareness of CVD risk factors would greatly assist in primary prevention efforts to reduce ACS morbidity and mortality in this population. Increased awareness of ACS symptoms and CVD risk factors could potentially reduce delays in seeking treatment for ACS.

What is unique in this population are the difficulties encountered with health care access (locale and poor cell service) which contributed to the significant treatment delays. While education will improve ACS symptom awareness, further work must be done to improve health care access and reduce health disparities on Native American reservations. This involves participation by advanced practice nurses on a governmental (Navajo Nation, state, and federal), health care and community level to recommend, facilitate and implement changes that are needed to begin moving in a positive direction.
Further research is needed on ACS symptoms and in Native American populations. Future ACS symptom research must include Native American men and women from different tribes to allow for transferability of the qualitative findings or generalizability of quantitative findings. Cultural influences on response to pain also need further study in order to have a better understanding of why there is delay in seeking treatment despite acute ACS symptoms.

**Conclusion**

The purpose of this DNP project was to describe the ACS experience among Native American adults who reside in northern Arizona and were diagnosed with an acute myocardial infarction. The Strong Heart Study was a landmark study on CVD that found rates for fatal and non-fatal heart disease were higher in Native Americans than in the U.S. population (Howard et al., 1999). Since then, few studies have examined ACS in Native American populations. This study is unique in that it was a qualitative dominant mixed methods design that provided insights into the ACS symptom experience in Native American men residing in northern Arizona. Findings from this study brought to light the ACS symptoms and the ACS experience of Native American men and reinforced current knowledge of the health disparities that exist in this population. New information about the difficulties encountered with health care access and contributing factors to treatment delay were discovered. The results of this study provided insight about the ACS symptoms experience in this population and will assist in the development of culturally-sensitive, community-based education programs directed toward the Native American population.
APPENDIX A:

RECRUITMENT SCRIPT FOR INITIAL CONTACT
RECRUITMENT SCRIPT FOR INITIAL CONTACT

Hello, my name is _________________ and I am a nurse working with Norria Brice, a University of Arizona College of Nursing graduate student. We are doing a study to learn more about the experiences of heart attack symptoms in Native Americans. We are recruiting people to answer questions about their heart attack symptoms experience and also to collect general information which will help describe Native Americans who have had a heart attack. I am inviting you to be a part of this study because you have experienced a heart attack. We are hoping that the findings of this study will help doctors, nurses and other health care workers provide culturally-sensitive care to Native Americans who have had heart attacks.

Your participation in this study is voluntary. If you decide not to participate or to withdraw from the study at any time, it will not affect your relationship, care, or treatment with your health care provider, Heart and Vascular Center of Arizona, or Flagstaff Medical Center.

If you would like to be a part of this study, please give me your telephone/mobile phone number and e-mail address. Norria Brice, the Principal Investigator, will get in touch with you and provide you with the details.

Thank-you!
APPENDIX B:

RECRUITMENT SCRIPT
RECRUITMENT SCRIPT

Hello, my name is Norria Brice. I am a graduate student at the University of Arizona in the College of Nursing. I am doing a research study to learn more about the experiences of heart attack symptoms in Native Americans who live in northern Arizona. I am hoping that the findings of this study will help doctors, nurses and other health care workers provide culturally-sensitive care to Native Americans who have had heart attacks. I am inviting you to be a part of this study because you have experienced a heart attack.

I am recruiting people to answer questions about their heart attack symptoms experience and also to collect general information which will help me describe Native Americans who have had a heart attack. There will be two interview sessions, each lasting about one hour. The first interview will take place over the telephone and the second will be a personal interview. The two interview sessions will be about one week apart. The second session will be audiotaped and the tapes will be securely stored in a locked box in my office and later destroyed when I finish the study.

Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, it will not affect your relationship, care, or treatment with your health care provider, Heart and Vascular Center of Arizona, or Flagstaff Medical Center. The results of the research may be published, but your name will not be used.

If you have any questions concerning this research study, you may call me at 928-606-0178 or by e-mail at nmbrice@email.arizona.edu.
APPENDIX C:

DEFERRAL OF IRB OVERSIGHT ACKNOWLEDGEMENT AND AUTHORIZATION AGREEMENT
Institutional Review Board (IRB)/Independent Ethics Committee (IEC)
Authorization Agreement

Name of Institution or Organization Providing IRB Review (Institution/Organization A):
Northern Arizona Healthcare IRB

IRB Registration #: IORC0004396

Federalwide Assurance (FWA) #, if any: FWA00009566

Name of Institution Relying on the Designated IRB (Institution B):
The University of Arizona

FWA #: 00004218

The Officials signing below agree that The University of Arizona may rely on the designated IRB for review and continuing oversight of its human subjects research described below: (check one)

( ) This agreement applies to all human subjects research covered by Institution B’s FWA.

( ) This agreement is limited to the following specific protocol(s):

Name of Research Project: The acute coronary syndrome experience among adult Native Americans in Northern Arizona

Name of Principal Investigator: Norria Brice, ACNP-BC

Sponsor or Funding Agency: None Award Number, if any: None

( ) Other (describe):

The review performed by the designated IRB will meet the human subject protection requirements of Institution B’s OHRP-approved FWA. The IRB at Institution/Organization A will follow written procedures for reporting its findings and actions to appropriate officials at Institution B. Relevant minutes of IRB meetings will be made available to Institution B upon request. Institution B remains responsible for ensuring compliance with the IRB’s determinations and with the Terms of its OHRP-approved FWA. This document must be kept on file by both parties and provided to OHRP upon request.

Signature of Signatory Official (Institution/Organization A):

Mark Donnelly Date: 4/8/2014

Print Full Name: Dr. Mark Donnelly Institutional Title: IRB Chair, Northern Arizona Healthcare

Signature of Signatory Official (Institution B):

Leslie P. Tolbert, Ph.D. Date: 4/18/14

Print Full Name: Leslie P. Tolbert, Ph.D. Institutional Title: Senior Vice President for Research
Date: April 15, 2014
Principal Investigator: Norria M Brice
Protocol Number: 1404289512
Protocol Title: The acute coronary syndrome symptom experience among adult Native Americans in Northern Arizona
Level of Review: Deferral of IRB Oversight
Determination: Approved

Institution Designated the IRB of Record: When an institution is the designated IRB of record, the UA IRB will not review the project. The University of Arizona agrees that it will rely on the review, approval, and continuing oversight by the institution IRB of those protocols approved by the institution pursuant to the terms of the Institutional Review Board Authorization Agreement (if applicable) and as outlined in the HSPP files.

- The University of Arizona maintains a Federalwide Assurance with the Office for Human Research Protections (FWA #00004218).
- All documents referenced in this submission have been reviewed and approved. Documents are filed with the HSPP Office. If subjects will be consented the approved consent(s) are attached to the approval notification from the HSPP Office.

This project has been reviewed and approved by an IRB Chair or designee.
APPENDIX D:

NAH IRB ADMINISTRATION LETTERS OF APPROVAL
TO: Norria Brice, NP

STUDY/ACTIVITY TITLE: [516300-1] ACS Symptom Experience in the Native American

SUBMISSION TYPE: New Project

REVIEW TYPE: Expedited Review

ACTION: APPROVED

APPROVAL DATE: March 5, 2014

NEXT REVIEW DUE: March 5, 2015

SPONSOR: None

RECLUSALS: N/A

Thank you for your submission. Your activity/study proposal has been APPROVED by the Northern Arizona Healthcare Institutional Review Board (NAH IRB) under the category of Expedited Review review based on applicable regulations. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research and/or activities must be conducted in accordance with this approved submission.

This study/activity has been determined to be a Minimal Risk project. It requires continuing review by NAH IRB on an annual basis unless otherwise noted in your review date. Please use the appropriate forms for this procedure.

Also, please be advised of the following stipulations of continuing approval for all NAH IRB studies/activities, as applicable:

- Review/Continuation of Study/Activity: Must be submitted to the IRB three (3) weeks prior to the study/activity review date and you will receive a courtesy reminder notice in advance of the deadline for submission (Next Review date is noted above, if applicable). Note that late submissions may result in studies/activities being temporarily suspended and/or closed to accrual of new subjects, or permanent closure;

- Amendments or Changes (Protocol or Consent Form): Unless done to eliminate immediate hazard to the subject/patient, any and all changes in the study/activity must be promptly submitted to the IRB and approved by the IRB prior to their implementation (i.e., Protocol revisions, Investigator/ Treating Physician changes, consent form revisions, etc.);

- Risks and Information: Unanticipated risks and new relevant information that may impact the risk/benefit ratio of the test article for the subject must be submitted to the IRB within five (5) working days;

- Adverse Events: Prompt reporting is required for events that are (a) unanticipated (i.e., not identified as reasonably foreseeable in the protocol and/or consent form and (b) of sufficient seriousness to affect the relative risks and benefits of participating in the study/activity as contemplated by the approved protocol and/or consent form). "Prompt" is defined to mean as soon as the seriousness of the issue reasonably demands. Serious adverse events should be reported.
to the IRB within one (1) week of Investigator/Treating Physician becoming aware of the event; any other unanticipated problem should be reported to the IRB within two (2) weeks;

- **Life Threatening/Death Events**: Any life-threatening event or study-related death must be submitted to the IRB within twenty-four (24) hours;

- **Emergency Use**: Emergency use of an Investigational Drug in a life-threatening situation, which must be documented and certified by an uninvolved Hospital physician, i.e., that the emergency existed which required use of the investigational article, must be submitted to the IRB within five (5) working days; and

- **Informed consent**: If applicable, please remember that informed consent is a process beginning with a description of the project and assurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the project via a dialogue between the researcher and research participant. Federal regulations require that each participant receives a copy of the consent document.

Please note that all research records must be retained for a **minimum** of three years after the completion of the project.

The IRB maintains the authority to terminate or suspend approval of research that is not being conducted in accordance with stated IRB requirements or that has been associated with unexpected serious harm to subjects. The IRB operates in compliance with 21 Code of Federal Regulations ("CFR") Part 56 and 45 CFR Part 46.

If you have any questions, please contact Gretchen McMasters at 928-773-2346 or gretchen.mcmasters@nahealth.com. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Northern Arizona Healthcare Institutional Review Board's records.
TO: Norria Brice, NP

STUDY/ACTIVITY TITLE: [516300-4] ACS Symptom Experience in the Native American

SUBMISSION TYPE: Continuing Review/Progress Report
REVIEW TYPE: Expedited Review

ACTION: APPROVED

APPROVAL DATE: February 9, 2015

NEXT REVIEW DUE: February 9, 2016

SPONSOR: N/A

RECUALS: N/A

Thank you for your submission. Your activity/study proposal has been APPROVED for continuation by the Northern Arizona Healthcare Institutional Review Board (NAH IRB) under the category of Expedited Review based on applicable regulations. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research and/or activities must be conducted in accordance with this approved submission.

This study/activity has been determined to be a Minimal Risk project and is operating under informed consent. It requires continuing review by NAH IRB on an annual basis unless otherwise noted in your review date. Please use the appropriate forms for this procedure.

Also, please be advised of the following stipulations of continuing approval for all NAH IRB studies/activities, as applicable:

- Review/Continuation of Study/Activity: Must be submitted to the IRB three (3) weeks prior to the study/activity review date and you will receive a courtesy reminder notice in advance of the deadline for submission (Next Review date is noted above, if applicable). Note that late submissions may result in studies/activities being temporarily suspended and/or closed to accrual of new subjects, or permanent closure.

- Amendments or Changes (Protocol or Consent Form): Unless done to eliminate immediate hazard to the subject/patient, any and all changes in the study/activity must be promptly submitted to the IRB and approved by the IRB prior to their implementation (i.e., Protocol revisions, Investigator/Treating Physician changes, consent form revisions, etc.).

- Risks and Information: Unanticipated risks and new relevant information that may impact the risk/benefit ratio of the test article for the subject must be submitted to the IRB within five (5) working days.

- Adverse Events: Prompt reporting is required for events that are (a) unanticipated (i.e., not identified as reasonably foreseeable in the protocol and/or consent form and (b) of sufficient seriousness to affect the relative risks and benefits of participating in the study/activity as contemplated by the approved protocol and/or consent form). "Prompt" is defined to mean as soon as the seriousness of the issue reasonably demands. Serious adverse events should be reported

- 1 -
to the IRB within one (1) week of Investigator/Treating Physician becoming aware of the event; any other unanticipated problem should be reported to the IRB within two (2) weeks;

- **Life Threatening/Death Events:** Any life-threatening event or study-related death must be submitted to the IRB within twenty-four (24) hours;

- **Emergency Use:** Emergency use of an Investigational Drug in a life-threatening situation, which must be documented and certified by an uninvolved Hospital physician, i.e., that the emergency existed which required use of the investigational article, must be submitted to the IRB within five (5) working days.

- **Informed consent:** If applicable, please remember that informed consent is a process beginning with a description of the project and assurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the project via a dialogue between the researcher and research participant. Federal regulations require that each participant receives a copy of the consent document.

Please note that all research records must be retained for a minimum of three years after the completion of the project.

The IRB maintains the authority to terminate or suspend approval of research that is not being conducted in accordance with stated IRB requirements or that has been associated with unexpected serious harm to subjects. The IRB operates in compliance with 21 Code of Federal Regulations ("CFR") Part 56 and 45 CFR Part 46.

If you have any questions, please contact Paula McAllister at 928-214-3616 or paula.mcallister@nahchealth.com. Please include your project title and reference number in all correspondence with this office.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Northern Arizona Healthcare Institutional Review Board’s records.
APPENDIX E:

INFORMED CONSENT DOCUMENTS
Northern Arizona Healthcare
1200 N. Beaver St, Flagstaff, AZ 86001
Institutional Review Board (IRB)

Authorization to Collect, Use, and Share Health information for Research

Northern Arizona Healthcare (NAH) protects your personal health information in compliance with federal law and requires researchers to explain to you how your personal health information will be used in research. This form will explain to you what information about you is being requested, how it will be used, how long it will be used for, and your rights. If you choose to sign this form, you will be granting the researchers at University of Arizona College of Nursing access to your personal health information obtained from Northern Arizona Healthcare (NAH).

What specific health information is being requested?

Your name, age, information about your heart attack, and any surgery or procedures that the doctors did on you. You will be asked questions about your experience leading up to and right before you were told you were having a heart attack. Other general information will also be collected, such as household, health insurance, usual health care provider, language spoken, where you live, utilities, distance to nearest health care facility, and transportation information which will help me describe Native Americans who have had a heart attack.

What will my information be used for?

To increase knowledge about the heart attack symptoms experience in Native Americans. To improve the provision of culturally-sensitive care to Native Americans who have had a heart attack. To increase awareness of heart attack symptoms in Native Americans.

Who will receive my information?

The information described above will be received by the researchers and their support personnel who are assisting with the research and who have had specific training in the confidentiality of personal health information. It may also be received by the NAH Institutional Review Board, which is a committee responsible for the protection of research participants, Office of Human Research Protections or other federal, state or international regulatory agencies, and the Food and Drug Administration, if requested.

The information will also be received by the University of Arizona College of Nursing Institutional Review Board. Your name and any protected-health information will be kept confidential.

HIPAA Authorization for Research 1/2014

Study Title: 

Consent Version Date: 1/29/2014

Approved by the IRB: __________________________ (to be filled in by IRB Coordinator)

Consent Model Sample Revised 03/22/13
How long will my information be used/accessed?

The information will no longer be accessed at the completion of the researcher’s final project defense in May 2014. Any information that does not need to be maintained to comply with regulatory requirements will be destroyed.

What if I do not want my information to be shared?

If you do not wish to have your information used, do not sign this form. If you do sign this form, then you decide to withdraw permission to use your personal health information, you can do so by filling out a Cancellation of Permission to Use Personal Health Information available from the research team or from the NAH Institutional Review Board.

By not signing this form, your personal health information will not be used and you will not be able to take part in this research. You will not be denied treatment if you do not sign this form.

What else do I need to know if I agree to participate and sign this form?

Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, it will not affect your relationship, care, or treatment with your health care provider, Heart and Vascular Center of Arizona, or Flagstaff Medical Center. The result of the research may be published, but your name or any other identifying information will not be used.

Northern Arizona Healthcare is required by law to protect your personal health information. By signing this form, you agree to allow Northern Arizona Healthcare to supply your information to Norria Brice for the research study: The Acute Coronary Syndrome Experience Among Adult Native Americans in Northern Arizona. You will be given a copy of this form to keep.

Printed name of participant

Signature of participant or legally authorized representative

Date

If you have questions about this form or the research being conducted, contact the NAH Institutional Review Board at 928-214-3616 or 928-774-2346, or by email at Paula.McAllister@nahealth.com.

HIPAA Authorization for Research: 1/2014

Study Title: ____________________________

Consent Version Date: 1/29/2014

Approved by the IRB: ____________________________ (to be filled in by IRB Coordinator)

Consent Model Sample Revised 03/22/13
MEDICAL RESEARCH SUBJECT’S BILL OF RIGHTS

The rights below are the rights of every person who is asked to participate in medical research.

As a research subject (participant), you have the following rights:

1. To be told the nature and purpose of the research.

2. To be told what will happen and whether any of the procedures, drugs or devices are different from what would be used in standard practice.

3. To be told about any significant risks, side effects or discomforts that can be reasonably expected from the research.

4. To be told of any expected benefits from participating in the research.

5. To be told the other available treatments that could be chosen instead, and how they may be better or worse than participating in the research.

6. To be allowed to ask any questions concerning the research both before agreeing to be involved and during the course of the study.

7. To be told what sort of medical treatment is available if any complications arise.

8. To refuse to participate at all or to withdraw consent to participate at any time, without jeopardizing the right to receive present or future care.

9. To receive a copy of the signed and dated consent form.

10. To be free of pressure when considering whether to agree to participate in the research.

Date: ____________________ Time: ______________

Signature: ________________________________ (patient)

Signature: ________________________________ (parent/legal guardian)

If signed by other than patient, indicate relationship: ____________________________

Witness: ________________________________

HIPPA Authorization for Research 1/2014

Study Title: ____________________________ (patient’s initials)

Consent Version Date: 1/29/2014

Approved by the IRB: ______________________ (to be filled in by IRB Coordinator)

Consent Model Sample Revised 032213
Northern Arizona Healthcare and  
The University of Arizona Consent to Participate in Research  

Study Title: The acute coronary syndrome experience among adult Native Americans in Northern Arizona  
Principal Investigator: Norria M. Brice, MSN, RN, ACNP-BC  
Sponsor: N/A  

This is a consent form for research participation. It contains important information about this study and what to expect if you decide to participate. Please consider the information carefully. Feel free to discuss the study with your friends and family and to ask questions before making your decision whether or not to participate.  

You may or may not benefit as a result of participating in this study. Also, as explained below, your participation may result in unintended or harmful effects for you that may be minor or may be serious, depending on the nature of the research.  

1. Why is this study being done?  
   Norria Brice, Principal Investigator, is a graduate student at the University of Arizona in the College of Nursing. This study, which is part of her program, is being done at Flagstaff Medical Center to learn more about the experiences of heart attack symptoms in Native Americans who live in Northern Arizona.  

2. How many people will take part in this study?  
   10-15 Native American men and women.  

3. What will happen if I take part in this study?  
   You will be asked to participate in two interview sessions. In the first session, the Principal Investigator will ask you background questions about you, as well as questions on heart disease and how to increase awareness of heart disease in Native American communities. In the second session, you will be asked questions about your heart attack symptom experience. The first interview will be audiotaped. If you do not want to be audiotaped, the Principal Investigator will write every answer you give to questions. To protect your privacy, the Principal Investigator will ask that you choose a different name that will be used in the study.  

4. How long will I be in the study?  
   Each of the two interview sessions will be about one hour long, scheduled one to two weeks apart.  

5. Can I stop being in the study?  
   Your participation is voluntary. You may refuse to participate in this study. If you decide to participate in the study, you may leave the study at any time. No matter what decision you make, there will be no penalty to you and you will not lose any of your usual benefits. Your decision will not affect your current or future relationship with The

Study Title: NAacute Coronary Experience  
Consent Version Date: 1/29/2014  
Approved by the IRB: _______  
(patient's initials)  
Page 1 of 4
6. What risks, side effects or discomforts can I expect from being in the study?
   There is minimal risk involved. To prevent fatigue, the interviews will take place in two,
   one hour sessions. The sessions will be scheduled one to two weeks apart.

7. What benefits can I expect from being in the study?
   The possible benefits for you are the opportunity to share your experiences with the
   interviewer and to know that by sharing your experience with heart attack symptoms and
   treatment you may help nurses and other health care providers give improved care to
   other Native Americans.

8. What other choices do I have if I do not take part in the study?
   You may choose not to participate without penalty or loss of benefits to which you are
   otherwise entitled.

9. Will my study-related information be kept confidential?
   Efforts will be made to keep your study-related information confidential. However, there
   may be circumstances where this information must be released. For example, personal
   information regarding your participation in this study may be disclosed if required by
   state or federal law.

   Also, your records may be reviewed by the following groups (as applicable to the
   research):
   - Northern Arizona Healthcare Institutional Review Board
   - Office for Human Research Protections or other federal, state, or international
     regulatory agencies
   - The University of Arizona Institutional Review Board or Office of Responsible
     Research Practices
   - The sponsor supporting the study, their agents or study monitors

   Study information gathered directly from you by the researchers will be part of your
   research records but will not be added to your medical record. Your research records are
   kept separate from the medical record and available to research staff working on this
   study.

10. What are the costs of taking part in this study?
    There will be no costs incurred to you other than your time for the interviews.

11. Will I be paid for taking part in this study?
    There will be no payments made for taking part in this study.
12. What are my rights if I take part in this study?

If you choose to participate in the study, you may discontinue participation at any time without penalty or loss of benefits. By signing this form, you do not give up any personal legal rights you may have as a participant in this study.

You will be provided with any new information that develops during the course of the research that may affect your decision whether or not to continue participation in the study.

You may refuse to participate in this study without penalty or loss of benefits to which you are otherwise entitled.

An Institutional Review Board responsible for human subjects research at Northern Arizona Healthcare and The University of Arizona and reviewed this research project and found it to be acceptable, according to applicable state and federal regulations and University policies designed to protect the rights and welfare of participants in research.

13. Who can answer my questions about the study?

For questions, concerns, or complaints about the study you may contact Norria Brice at 928-606-0178 or email at nmbrice@email.arizona.edu.

For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Northern Arizona Healthcare IRB at 928-773-2346. For questions about a study-related injury, you may contact Norria Brice at 928-606-0178 or email at nmbrice@email.arizona.edu

Signing the consent form

I have read (or someone has read to me) this form, and I am aware that I am being asked to participate in a research study. I have had the opportunity to ask questions and have had them answered to my satisfaction. I voluntarily agree to participate in this study.

I am not giving up any legal rights by signing this form. I will be given a copy of this form.

Printed name of subject

Signature of subject

Date and time

Printed name of person authorized to consent for subject (when applicable)

Signature of person authorized to consent for subject (when applicable)

Relationship to the subject

Date and time

Study Title: NA Acute Coronary Experience

Consent Version Date: 1/29/2014

Approved by the IRB: __________

(patient’s initials)
Investigator/Research Staff

I have explained the research to the participant or the participant’s representative before requesting the signature(s) above. There are no blanks in this document. A copy of this form has been given to the participant or to the participant’s representative.

Printed name of person obtaining consent

________________________________________

Signature of person obtaining consent

________________________________________

AM/PM

Date and time

Study Title: NA Acrete Coronary Experience

Consent Version Date: 1/29/2014

Approved by the IRB: _________

_________ (patient’s initials)

Page 4 of 4
APPENDIX F:

DEMOGRAPHIC QUESTIONNAIRE
DEMOGRAPHIC QUESTIONNAIRE

1. What is your sex? __________

2. Are you employed? Yes _____ No _____

3. If so, what is your job? ______________________

4. What is the relationship of your household members to you?
   a. ______________________
   b. ______________________
   c. ______________________
   d. ______________________
   e. ______________________
   f. ______________________
   g. ______________________
   h. ______________________
   i. ______________________

5. Do you receive disability benefits? Yes _____ No _____

6. If so, what is your disability? ______________________

7. What is your Health care insurance?
   a. Private _____
   b. Medicare _____
   c. Medicaid (AHCCCS) _____
   d. None _____

8. Where do you usually get your health care?
   a. Private provider at? ________________
b. IHS at? ______________

c. None ____

9. What is your first language? ________________

10. What language do you use at home? ________________

11. Where do you live? ________________
    a. If live on a reservation, how many years have you lived there? __________

12. In your home, do you have:
    a. Running water? Yes _____ No _____
    b. Electricity? Yes _____ No _____
    c. Propane? Yes _____ No _____

13. What are the total miles from your home to the nearest place for health care? ________

14. What is your usual transportation?
    a. Personal vehicle _____
    b. Vehicle of family members/others _____
    c. SafeRide _____
    d. None _____
    e. Other _____
APPENDIX G:

SEMI-STRUCTURED INTERVIEW GUIDE
SEMI-STRUCTURED INTERVIEW GUIDE

1. Tell me what you know about heart disease and its risk factors.

2. Tell me about your heart attack experience, including symptoms that you had in the beginning until you were at the hospital.

3. Tell me about how you decided not to go or decided much later to go for treatment for your heart attack symptoms.

4. Tell me about how you decided to go for treatment for your heart attack symptoms.

5. Tell me what you think is the best way to teach other Native Americans about heart disease, its risk factors, and heart attack symptoms (The fifth question was generated by the PI based on clinical observations of participants having little knowledge of heart disease and its risk factors and also to elicit ideas how to increase ACS awareness in Native American communities).

Probing questions to help participants expand on their responses to provide a richer interview:

1. "Tell me a little more about that."

2. "What happened next?"

3. "How did that happen?"

4. "What was that like for you?"
APPENDIX H:

MAPMISS QUESTIONNAIRE
Title: The Acute Coronary Syndrome Experience among Native American adults in northern Arizona

Survey Date: ________________

1. Was this your first heart attack? [ ] NO [ ] YES
   If no, how many heart attacks including this one, have you had? __________

   These first questions are about the symptoms you experienced during and prior to your most recent heart attack.

2. Date of your (most recent) heart attack? ________________

   First I am going to ask you some specific questions that occurred during your heart attack.

3. What were the major symptoms you had that made you realize you were having a heart attack? Try to list at least 3

   □ Chest pain        □ Back/top of shoulder pain    □ Arm sensations/pain
   □ Indigestion      □ Nausea/vomiting           □ Fatigue
   □ Didn’t feel good □ Shortness of breath      □ Sweating
   □ Didn’t know/realize □ Other

   Describe other:
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________

   Symptoms during heart attack

4. Let’s talk about other symptoms you had during your heart attack. During your heart attack, did you have any pain or discomfort? [ ] NO [ ] YES

   Where was it located? How severe?
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________
<table>
<thead>
<tr>
<th>Location</th>
<th>Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generalized chest</td>
<td>Yes</td>
</tr>
<tr>
<td>Centered high in chest</td>
<td>Yes</td>
</tr>
<tr>
<td>Left breast</td>
<td>Yes</td>
</tr>
<tr>
<td>Neck/throat</td>
<td>Yes</td>
</tr>
<tr>
<td>Jaw/teeth</td>
<td>Yes</td>
</tr>
<tr>
<td>Back, between/under shoulder blades</td>
<td>Yes</td>
</tr>
<tr>
<td>Top of shoulders</td>
<td>Yes</td>
</tr>
<tr>
<td>Both arms</td>
<td>Yes</td>
</tr>
<tr>
<td>Left arm or shoulder</td>
<td>Yes</td>
</tr>
<tr>
<td>Right arm or shoulder</td>
<td>Yes</td>
</tr>
<tr>
<td>Leg(s)</td>
<td>Yes</td>
</tr>
<tr>
<td>Other:</td>
<td></td>
</tr>
</tbody>
</table>

Describe other:
______________________________________________________________________________
______________________________________________________________________________

5. What one word on this list best describes the major sensation you experienced during your heart attack?

<table>
<thead>
<tr>
<th>Major sensation</th>
<th>1st Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>[] Ache</td>
<td>[] Sharpness</td>
</tr>
<tr>
<td>[] Burning</td>
<td>[] Soreness</td>
</tr>
<tr>
<td>[] Crushing</td>
<td>[] Spasm</td>
</tr>
<tr>
<td>[] Fullness</td>
<td>[] Tightness</td>
</tr>
<tr>
<td>[] Heat</td>
<td>[] Tingling</td>
</tr>
<tr>
<td>[] Pressure</td>
<td>[] Other</td>
</tr>
</tbody>
</table>

Intensity: [ ] Mild [ ] Medium [ ] Severe

2nd Sensation______________ Other__________________________

2nd Location______________ Other__________________________
6. I am also interested in general symptoms that occurred during your heart attack. I will state a symptom and you answer yes or no. Was the sensation mild, medium, or severe?

<table>
<thead>
<tr>
<th>Generalized Symptom</th>
<th>No</th>
<th>Mild</th>
<th>Medium</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold sweat</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hot, flushed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very tired, unusual fatigue</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Felt weak</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Heart and lung</th>
<th>No</th>
<th>Mild</th>
<th>Medium</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cough</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart racing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shortness of breath/difficulty breathing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gastrointestinal</th>
<th>No</th>
<th>Mild</th>
<th>Medium</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Were you a smoker at the time of your heart attack?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in taste of cigarettes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Choking sensation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of appetite</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indigestion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nausea</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vomiting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sensation in arms</th>
<th>No</th>
<th>Mild</th>
<th>Medium</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arms weak/ heavy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arms ache</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hand/arms tingling</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arms swollen</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numbness or burning of arms, if yes mark one below:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both arms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right arm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left arm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numbness or burning of hands/ fingers, if yes mark one below:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both arms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right arm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left arm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Neurological symptoms

<table>
<thead>
<tr>
<th>Symptom</th>
<th>No</th>
<th>Mild</th>
<th>Medium</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dizzy or faint(ed)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New onset of vision problems</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Headaches</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. Are there any other symptoms that you believe were associated with your heart attack that were not included in the above list? [ ] NO [ ] YES

Please list:

______________________________________________________________________________

______________________________________________________________________________

### Reasons for seeking treatment

8. Some people have trouble recognizing they are having a heart attack and delay seeking treatment. I am interested in how long it took you to get to the hospital.

   A. From the beginning of your symptoms until you arrived at the hospital?

<table>
<thead>
<tr>
<th>Days:</th>
<th>[ ] In hospital at time of heart attack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours:</td>
<td>[ ] Can’t remember / Don’t know</td>
</tr>
<tr>
<td>Minutes:</td>
<td>Total hours:</td>
</tr>
</tbody>
</table>

   B. From the most severe symptom until you arrived at the hospital?

<table>
<thead>
<tr>
<th>Days:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours:</td>
<td>[ ] Can’t remember / Don’t know</td>
</tr>
<tr>
<td>Minutes:</td>
<td>Total hours:</td>
</tr>
</tbody>
</table>

   C. I need to know how long your heart attack episode lasted. How long was it from the beginning of your symptoms until you were told you had a heart attack?

<table>
<thead>
<tr>
<th>Days:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours:</td>
<td></td>
</tr>
<tr>
<td>Minutes:</td>
<td>Total hours:</td>
</tr>
</tbody>
</table>

   D. Before you were diagnosed, when did you think you were first having a heart attack?

<table>
<thead>
<tr>
<th>Days:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours:</td>
<td></td>
</tr>
<tr>
<td>Minutes:</td>
<td>Total hours:</td>
</tr>
</tbody>
</table>

   E. What did you think was happening to you when you first started having symptoms?

   [ ] Heart attack        [ ] Stress/anxiety
   [ ] Indigestion         [ ] Didn’t know
   [ ] Breathing problems/asthma [ ] Other
   [ ] Hiatal hernia/gallbladder Describe other:
9. What symptom(s) convinced you to seek help from a doctor, emergency personnel, or other health care provider?

| [ ] Pain-symptom would not go away | [ ] Indigestion/nausea/vomiting |
| [ ] Severity of pain               | [ ] Someone else called or told you to go |
| [ ] Chest pain                     | [ ] Other                       |
| [ ] Shortness of breath            | Describe other:                 |

10. When you had your heart attack, what made you decide to go to the hospital?

(Select the most important reason only)

[ ] The symptoms did not go away
[ ] Friend/relative told you to go to the hospital
[ ] You were afraid/anxious
[ ] You knew this was different
[ ] Other
[ ] Doctor/medical person told me to go

**Symptoms prior to heart attack**

Now I am going to ask you some specific questions about symptoms that you believe were associated with your heart attack that occurred leading up to, but not during your heart attack AND have changed (lessened or gone away) since your heart attack.

11. Some people experience pain leading up to their heart attack and others experience sensation or discomfort. Leading up to your heart attack, did you have pain or discomfort?

YES ____ NO ____

Start at the beginning of the table. (Check all that apply and describe each.)

<table>
<thead>
<tr>
<th>PAIN or DISCOMFORT LOCATION if YES, indicate intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Check one box for intensity, time frame, and frequency if YES is indicated)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>Intensity:</th>
<th>Time frame:</th>
<th>Frequency:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Mild</td>
<td>Medium</td>
</tr>
<tr>
<td>Generalized chest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Centered high in chest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left breast</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neck/throat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jaw/teeth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Back, between/ under shoulder blades</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top of shoulders</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both arms</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
12. I am going to list some words, and I want you to tell me which word best describes sensation(s) you had before your heart attack. How severe were these? Where were they located?

<table>
<thead>
<tr>
<th>Term</th>
<th>[ ] No</th>
<th>[ ] Mild</th>
<th>[ ] Medium</th>
<th>[ ] Severe</th>
<th>1&lt;sup&gt;st&lt;/sup&gt; location:</th>
<th>2&lt;sup&gt;nd&lt;/sup&gt; location:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ache</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crushing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fullness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sharpness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soreness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spasm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tightness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tingling</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Describe other:
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

None [ ] NO
13. Please tell me what other general symptoms you had. (For each symptom ask: When before your heart attack did it start? How often did it occur?)

**Generalized Symptoms**

<table>
<thead>
<tr>
<th>Generalized Symptom</th>
<th>How severe was it?</th>
<th>When before your heart attack did it start?</th>
<th>How often did it occur?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Mild</td>
<td>Med/Arm</td>
</tr>
<tr>
<td>Very tired, unusual fatigue</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleep disturbance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxious</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Heart and lung</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cough</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart racing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shortness of breath/orthopnea</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficulty breathing during the night</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gastrointestinal</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of appetite</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequent indigestion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sensation in arms</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arms weak/heavy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arms ache</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hand/arms tingling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numbness or burning of arms, if yes mark one below:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Both arms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Right arm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Left arm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numbness or burning of hands/fingers, if yes mark one below:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Both arms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Right arm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Left arm</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Neurological symptoms

<table>
<thead>
<tr>
<th>Neurological symptoms</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>New onset of vision problems</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased intensity of headaches</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased frequency of headaches</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in thinking or remembering</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other: (describe)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

14. Of these symptoms you told me about,

a. Did you think any of these were because of a heart problem before you were told you had a heart attack? [ ] NO [ ] YES

b. If YES, which ones?

- [ ] Chest pain
- [ ] Shortness of breath
- [ ] Arm-shoulder pain/sensation
- [ ] Sensation arms/hands
- [ ] Indigestion

- [ ] Tiredness/fatigue
- [ ] Sleep problems
- [ ] Headache
- [ ] Other

Describe other:

c. Did you tell your doctor about any of these before you had your heart attack?

[ ] NO [ ] YES

d. If YES, which ones:

- [ ] Chest pain
- [ ] Shortness of breath
- [ ] Arm-shoulder pain/sensation
- [ ] Sensation arms/hands
- [ ] Indigestion

- [ ] Tiredness/fatigue
- [ ] Sleep problems
- [ ] Headache
- [ ] Other

Describe other:

15. Sometimes after a heart attack the symptoms people had before the heart attack lessen or go away. Did you notice that happening with any of the following symptoms? If NO, skip to the next question. [ ] NO

- [ ] Indigestion
- [ ] Back pain or discomfort
- [ ] Cough
- [ ] Headaches
- [ ] Vision problems
- [ ] Other

Describe other:
Comorbidity

16. The next set of questions asks about your general health and other medical problems you may have had. If you answer YES, I will ask you when you were first told this information. Have you been told you have:

<table>
<thead>
<tr>
<th>Condition</th>
<th>No</th>
<th>Yes, before attack</th>
<th>Yes, since attack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest pain due to heart problems (angina)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coronary heart disease</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart irregularity, heart murmur, or heart valve disease</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High blood pressure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High cholesterol</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic lung disease, emphysema, asthma, or bronchitis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression or other emotional troubles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cancer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes/low blood sugar</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic heart burn, stomach problems (GERD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic back pain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic joint problems (arthritis)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Osteoporosis (brittle bones)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stroke</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Migraine headaches (sick)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thyroid disease</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gallbladder disease</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

17. FEMALES: Have you ever had a hysterectomy (womb removed)?
If NO, skip to question #20. [ ] NO [ ] YES

18. FEMALES: What age were you when you had your hysterectomy (womb removed)?
_____ years

19. FEMALES: Did you have both your ovaries removed? [ ] NO [ ] YES [ ] Don’t know

20. FEMALES: Have you gone through or are you now going through menopause?
If NO, skip to question #22. [ ] NO [ ] YES

21. FEMALES: Can you tell me approximately at what age your monthly periods stopped?
Age:_______ [ ] Have not stopped yet
22. FEMALES: Compared to a year ago, has the number of days between the start of one monthly period and the start of your next monthly period become less predictable? If NO, skip to question #30. [ ] NO [ ] YES

23. FEMALES: Estrogen, such as Premarin, and progestins, such as Provera, are female hormones that may be prescribed around the time of menopause, after menopause, or after a hysterectomy. Before your heart attack, did your doctor or health care provider discuss the benefits of estrogen to your heart with you? If YES, what benefits?

| [ ] No | If Yes, what benefits: |
| [ ] Yes | [ ] Cardiac |
| [ ] Don’t know/not sure | [ ] Bones |
| [ ] Others list: |

24. FEMALES: Have you ever taken female hormones? If NO, skip to question #30. [ ] NO [ ] YES

25. FEMALES: Since prescribed, have you taken female hormones continuously? If YES, skip to question #28. [ ] NO [ ] YES

26. FEMALES: How long ago did you stop? Years: ________ Months: ________ Total months: ________

27. FEMALES: Why did you stop taking female hormone replacements? (Check all that apply).

| [ ] Bleeding | [ ] Fear of Cancer |
| [ ] Bad side effects | [ ] Cost |
| [ ] Didn’t think they were necessary any longer | [ ] Other |
| [ ] Doctor did not encourage you to take hormones | List other: |

28. FEMALES: Were you taking female hormones at the time of your heart attack? [ ] NO [ ] YES

29. FEMALES: How many years have you taken female hormones? ________

30. FEMALES: Did you ever take birth control pills before your heart attack? [ ] NO [ ] YES

31. FEMALES: Were you taking birth control pills when you had your heart attack? [ ] NO [ ] YES

32. FEMALES: How many years did you take birth control pills? ________
33. Which of the following medications did you take on a regular basis before your heart attack?

<table>
<thead>
<tr>
<th>(Check all that apply)</th>
<th>Check for yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug to lower blood pressure (vasotec, cardiazem, nifedipine)</td>
<td>[ ]</td>
</tr>
<tr>
<td>Drug to lower blood sugar (insulin or hypoglycemic)</td>
<td>[ ]</td>
</tr>
<tr>
<td>Cholesterol lowering drug</td>
<td>[ ]</td>
</tr>
<tr>
<td>Drug to treat angina (nitroglycerin)</td>
<td>[ ]</td>
</tr>
<tr>
<td>Heart drugs (digoxin, calcium channel blocker)</td>
<td>[ ]</td>
</tr>
<tr>
<td>Arthritis (celebrex, vioxx)</td>
<td>[ ]</td>
</tr>
<tr>
<td>Sinus or allergy medications (Claritin, allegra, sudafed)</td>
<td>[ ]</td>
</tr>
<tr>
<td>Thyroid medication (synthroid)</td>
<td>[ ]</td>
</tr>
<tr>
<td>Water pill (lasix, thiazide)</td>
<td>[ ]</td>
</tr>
<tr>
<td>Vitamins</td>
<td>[ ]</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>[ ]</td>
</tr>
<tr>
<td>Stomach pills (zantac, tagament, Maalox)</td>
<td>[ ]</td>
</tr>
<tr>
<td>Aspirin (bufferin, ecotrin)</td>
<td>[ ]</td>
</tr>
<tr>
<td>Nerve pill (xanax, valium, Prozac)</td>
<td>[ ]</td>
</tr>
<tr>
<td>Other medication</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

List other medications:

______________________________________________________________________________

______________________________________________________________________________

| In the 2 weeks before your heart attack, did you use cocaine?        | [ ]           |
| In the 2 weeks before your heart attack did you use stimulants (such as caffeine pills, diet pills, or “uppers”)? | [ ]           |

[ ] Do not take medications

**Risk Factors**

The next set of questions ask about your personal and family history. These are questions that provide information about Native American risk factors that may contribute to a heart attack.

34. Has anyone in your family (mother, father, siblings, aunts, uncles, grandparents) ever had a: (Check all that apply)

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>[ ] No</th>
<th>[ ] Yes</th>
<th>[ ] Don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart attack</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stroke</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart failure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High blood pressure</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
35. Have you ever smoked at least 100 cigarettes (approximately 5 packs) in your entire life?  
   If NO, skip to #38. [ ] NO [ ] YES

36. Were you a smoker at the time of your heart attack? [ ] NO [ ] YES

37. On the average, about how many cigarettes a day did you smoke before your heart attack?  
   (Approximately 20 cigarettes per pack)  
   Number of packs? _________ [ ] Don’t know/not sure

38. **Before** your heart attack, were you at any time in your life exposed to secondhand smoke  
   every day or most days? [ ] NO [ ] YES

39. How long were you consistently exposed to secondhand smoke?  
   (Record in years): _________

40. What was your weight **before** your heart attack? ________________________________

41. How tall are you?  
   Feet: _________ Inches: _________ Total inches: ___________________

**The next few questions are about exercise, recreation, or physical activities other than your  
regular job duties.**

42. In the six months before your heart attack, did you participate in any physical activity such as  
   running, calisthenics, golf, gardening, or walking for exercise?  
   If NO, continue to question #50. [ ] NO [ ] YES

43. What was the one type of physical activity you participated in most often?  
   [ ] Walking  [ ] Gardening  [ ] Housework  [ ] Golfing  
   [ ] Aerobic exercise  [ ] Non-aerobic exercise  [ ] Swimming  [ ] Dancing  
   [ ] Other

   List other:  
   ____________________________________________________________________________
   ____________________________________________________________________________
   ____________________________________________________________________________
   ____________________________________________________________________________

44. How many times per week or month did you participate in this activity?  
   Months: ________ Weeks: _________ Total weeks: _________________  
   [ ] Don’t know/not sure
45. And when you took part in this activity, for how many minutes or hours did you usually keep at it?
   Hours: __________ Minutes: __________ Total minutes: ____________

46. Was there another physical activity or exercise that you regularly participated in before your heart attack?
   If NO, continue to question #50 [ ] NO [ ] YES

47. What other type of physical activity gave you the most exercise?

   [ ] Walking  [ ] Gardening
   [ ] Housework  [ ] Golfing
   [ ] Aerobic exercise  [ ] Non-aerobic exercise
   [ ] Swimming  [ ] Dancing
   [ ] Other

   List other: ____________________________________________________________
   _______________________________
   ____________________________________________________________

48. How many times per week or month did you take part in this activity?
   Months: ________ Weeks: __________ Total weeks: ______________
   [ ] Don’t know/not sure

49. And when you took part in this activity, for how many minutes or hours did you usually keep at it?
   Hours: __________ Minutes: __________ Total minutes: ____________
   [ ] Don’t know/not sure

50. Were you employed or self-employed, such as providing childcare in your home, at the time of your heart attack?  [ ] NO [ ] YES

51. Was your work outside the home: [ ] Full time [ ] Part time

52. Compared with work before your heart attack, has anything about your work changed? For example, do you have a different schedule?

   [ ] Decreased work performance (physical work changes such as lifting, or you slowed down)  [ ] Decreased work time
   [ ] Retired  [ ] Stopped working
   [ ] Other
Describe other:
______________________________________________________________________________
______________________________________________________________________________

53. Did you have children or grandchildren living in your home the year before your heart attack? [ ] NO [ ] YES

54. How many? ________________________________

55. What were their ages?
[ ] Child 12 or under [ ] Child 13-21 [ ] Adult over 21

56. Were you responsible for the care of another person before your heart attack? For example, were you caring for an elderly parent, an ill husband, disabled child, or grandchild? [ ] NO [ ] YES

57. Did your responsibilities include (check all that apply)
[ ] Providing minimal care
[ ] Providing care with help from others
[ ] Providing total care

58. From what sources do you get your information about heart disease? (Check all that apply)

| [ ] Family, friends | [ ] Newspaper |
| [ ] Magazines       | [ ] Radio     |
| [ ] Doctor or health care provider | [ ] Internet |
| [ ] Television      | [ ] Other     |
| [ ] Medical or health literature |

Describe other:
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

Demographic characteristics

The last set of questions concerns general information which will help me to describe people who have had a heart attack.

59. What is your birthdate? ________________________________

60. What is your race? ________________________________
61. What is your marital status?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Never married</td>
<td></td>
</tr>
<tr>
<td>Divorced/separated</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td></td>
</tr>
<tr>
<td>Did not respond</td>
<td></td>
</tr>
</tbody>
</table>

62. What is the highest level or grade of school you have completed?

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>Degree or School</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st-4th grade</td>
<td>Some college or vocational school</td>
</tr>
<tr>
<td>5th-8th grade</td>
<td>College graduate</td>
</tr>
<tr>
<td>9th-11th grade</td>
<td>Postgraduate work</td>
</tr>
<tr>
<td>12th grade or GED</td>
<td>Doctorate degree</td>
</tr>
</tbody>
</table>

63. This question has to do with finances. I am interested to know if you have enough money to buy medication and take care of yourself. For that reason, I would like to know your approximate average combined yearly household income? If the participant will not give out this information, ask if they would mind indicating whether their income is over or below $30,000 a year.

<table>
<thead>
<tr>
<th>Income Range</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $10,000</td>
<td>$10,000 - $19,999</td>
</tr>
<tr>
<td>$20,000 - $29,999</td>
<td>$30,000 - $39,999</td>
</tr>
<tr>
<td>$40,000 - $49,999</td>
<td>$50,000 - $59,999</td>
</tr>
<tr>
<td>$60,000 - $69,999</td>
<td>$70,000 - $79,999</td>
</tr>
<tr>
<td>$80,000 - $89,999</td>
<td>$90,000 - $99,999</td>
</tr>
<tr>
<td>Over $100,000</td>
<td>Don’t know</td>
</tr>
<tr>
<td>Refused</td>
<td></td>
</tr>
<tr>
<td>Less than $30,000</td>
<td>Greater than $30,000</td>
</tr>
<tr>
<td>Refused /Don’t know</td>
<td>Answered above</td>
</tr>
</tbody>
</table>

64. How many people does this support? ________________________________

65. Compared to 1 year before your heart attack, have you noticed any changes in your memory?

<table>
<thead>
<tr>
<th>Memory Type</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>Short-term memory</td>
</tr>
<tr>
<td>Long-term memory</td>
<td>Both short and long-term memory</td>
</tr>
</tbody>
</table>

66. When we have the results of this study and know Native Americans’ common symptoms of a heart attack, what do you think is the best way to get this information to other Native Americans?

___________________________________________________________________________

____________________________________________

_______________________________

___________________________________________________________________________

________________________________________
Thank you for helping us find out what symptoms Native Americans have with their heart attacks. Your answers have been very helpful.

### Scoring in general

<table>
<thead>
<tr>
<th>Score intensity as:</th>
<th>Score frequency as:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0= No</td>
<td>0= Not experiencing symptoms</td>
</tr>
<tr>
<td>1= Mild</td>
<td>1= Less than monthly</td>
</tr>
<tr>
<td>2= Medium</td>
<td>2= Monthly</td>
</tr>
<tr>
<td>3= Severe</td>
<td>3= At least 2x per month</td>
</tr>
<tr>
<td></td>
<td>4= At least 1x per week</td>
</tr>
<tr>
<td></td>
<td>5= Several times per week</td>
</tr>
<tr>
<td></td>
<td>6= Daily</td>
</tr>
</tbody>
</table>

Prior to beginning analysis, please create two separate variables for the following questions.

a) Question 6 with arms. One variable will tell whether or not there was a burning in the right arm and one will tell whether there was a burning in the left arm.

b) Question 6 with hands/fingers. One variable will tell whether or not there was numbness in the right hands/fingers and one will tell whether or not there was numbness to the left hands/fingers. (Score as 1 if present and 0 if not present)

c) Question 13 with arms. One variable will tell whether or not there was a burning in the right arm and one will tell whether there was a burning in the left arm.

d) Question 13 with hands/fingers. One variable will tell whether or not there was numbness in the right hands/fingers and one will tell whether or not there was numbness to the left hands/fingers.

e) To create acute severity of arms, multiply whether or not the left arm was involved by the intensity reported and multiply whether or not the right arm was involved by the intensity reported. Do this for questions 6 and 13.

f) To create acute severity of hands/fingers, multiply whether or not the left hands/fingers was involved by the intensity reported and multiply whether or not the right hands/fingers was involved by the intensity reported. Do this for questions 6 and 13.

As a result when creating scores if both arms or hands were involved that information will be captured by including both the left and the right.

### Acuity Score:

Sum the 12 responses from question 4 (including other) and the 25 from question 6 (including 2 for arms and 2 for hand/fingers weighted as described above) and the 1 other from question 7. This gives a score that could range from 0 (no acute symptoms) to 114 (38 acute symptoms with a maximum intensity of 3 each).
**Number of Acute symptoms:**

Dichotomize questions 4, 6 and 7 to 1 if symptom present and 0 if symptom not present. Sum the 12 symptoms from question 4, the 25 from responses to question 6, and 1 including other from question 7. The score can range from 0 to 38.

**Prodromal score**

The prodromal symptoms are from question 11 & 13. For each symptom multiply the intensity by the frequency. This would result in 12 scores for question 11, and 21 from question 13 including other and 2 each for numbness in arms and tingling in hands. Total these 33 scores to create the prodromal score.

**Number of prodromal symptoms**

Dichotomize the symptoms in question 11 and 13 based on the intensity of each symptom. Give a 1 if the intensity is mild, medium, or severe, and give a 0 if the respondent does not experience that symptom. The number of prodromal symptoms can range from 0 to 33.

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REFERENCES


Indian Health Service. (n.d.). Retrieved from https://www.ihs.gov/Navajo/


