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Assessing the Gender Component in Coronary Heart Disease; A Comparative Analysis of Osteopathic and Allopathic Rural Physicians' Medical Approaches to Diagnosing and Treating Female Coronary Heart Disease

Victoria S. Curtis
Western Michigan University

ASSESSING THE GENDER COMPONENT IN CORONARY HEART DISEASE: A COMPARATIVE ANALYSIS OF OSTEOPATHIC AND ALLOPATHIC RURAL PHYSICIANS' MEDICAL APPROACHES TO DIAGNOSING AND TREATING FEMALE CORONARY HEART DISEASE

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Victoria S. Curtis

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Victoria S. Curtis, Ph.D.

Western Michigan University, 2004

Heart disease is the number one killer among women in the United States. This dissertation examines how the knowledge base of rural physicians affects their approach to diagnosing female heart disease. It compares the knowledge base of doctors trained in osteopathic medicine with doctors trained in allopathic medicine to determine if knowledge base affects how women are diagnosed in comparison with men.

Current data suggests that a male model of recognized heart symptoms is most often used to diagnose heart disease, that women and men experience different cardiac symptoms, and those physicians more often overlook and/or misdiagnose women presenting with heart disease. Because osteopathic medical education favors a holistic approach, it is hypothesized that osteopathic doctors would consider a broader range of complaints as having a cardiac component

and that osteopathic physicians would therefore diagnose heart disease in women patients at higher rates than allopathic physicians. Moreover, because female physicians have historically taken a holistic approach, it is hypothesized that female physicians would diagnose heart disease in women patients at higher rates than male physicians.

The study surveys 700 rural Michigan physicians, and uses a case history medical vignette to describe women's heart symptoms. Using crosstabulation and chi-square, statistically significant relationships were found between osteopathic and allopathic physicians, and between male and female physicians, for how physicians diagnose and treat female and male patients with heart symptoms. These findings have far-reaching policy implications for women's coronary heart disease outcomes.

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LIST OF ACRONYMS

Name	Definition
COPD	Chronic Obstructive Pulmonary Disease
PUD	Peptic Ulcer Disease
AAS	Acute Abdominal Series
CXR	Chest X-ray
EKG	Electrocardiogram
CPK-MB	Creatine kinase-MB
RLL	Right Lower Lung
RUQ	Right Upper Quadrant

CHAPTER ONE:
THE PROBLEM OF WOMEN AND HEART DISEASE

Introduction to the Problem

Heart disease is currently the number one killer of American women. Since 1996, coronary heart disease (CHD) has consistently remained the leading cause of death in postmenopausal women of the United States. According to 1996 figures taken from the Women's Health Initiative, a program supported by the National Institute of Health to study American women's health, "approximately half of all coronary deaths occur in women" (Women's Health Initiative, 2004: 1). Moreover, morbidity and mortality rates surveyed over the last four years reveal the number of women reported with documented coronary events increasing, while men's coronary rates are improving (American Heart Association, 2004). This data represents a disturbing trend about women's heart outcomes and underscores the need for further research and evaluation in the arena of women's coronary heart disease.

This study focuses on rural physicians' diagnosis and treatment of coronary heart disease among women. Rural physicians are targeted because specific knowledge on how

rural physicians diagnose and treat female heart disease is lagging or absent. In 1999, the Michigan Department of Community Health sponsored a Rural Health Initiative to assess rural needs for technologies, including knowledge technologies. In other words, they were interested in assessing existing knowledge and in identifying areas where new knowledge was needed among rural practitioners. This dissertation will argue that gendered models of heart disease is one of the factors that must be considered in assessing knowledge technologies currently used to diagnose and treat heart disease in men and women in rural communities. I examine how rural physicians diagnose and treat female heart disease in comparison with how they diagnose and treat male heart disease.

The study was specifically designed to assess the affects of the medical approaches taken by osteopathic in comparison with allopathic physicians in diagnosing and treating women's coronary disease. In addition, it was specifically designed to assess the affects of the physicians' sex on diagnosing and treating coronary heart disease in women and men. In particular, this study assesses the adequacy of the prevailing knowledge technologies for diagnosing and treating female coronary heart disease. Because the prevailing knowledge technology

is a male model, I argue that one of the primary technologies needed today is a female model of heart disease.

Statement of the Problem

The following scenario depicts a problem that women all too often experience in their visits to the emergency room.

A 55-year-old white female enters a hospital emergency room at 9:00 in the morning complaining of slight to moderate right upper-abdominal discomfort, slight dizziness, and mild nausea. She states she had not vomited this morning, but complains of moderate left-sided neck and shoulder pain that has increased in intensity upon awakening. Initial onset of symptoms began approximately five hours earlier. The patient also reports mild shortness of breath accompanied with slight sweating and clamminess. She does report experiencing mild chest pain that she describes as a mild dull ache. However, she denies any pain radiating down one or both arms. The patient denies any previous history of heart disease. She does reveal a positive family history of coronary heart disease. She reports that both her father and uncle (the father's youngest sibling) died of acute myocardial infarction (i.e. sudden heart attacks) within the last 10

years. She reports her mother is still living and has been treated for the past ten years by her family physician for moderate hypertension and mild adult-onset diabetes that is diet controlled. The patient reports her fifty-seven year old male sibling has been medically treated over the past five years for hypertension and hyperlipidemia controlled by diet and medication.

The patient reports experiencing menopausal symptoms commencing approximately seven years ago. Menses are irregular. She reports experiencing occasional hot flashes, mostly at night. The patient states she is not taking hormonal replacement therapy at this time. She reports a positive history of smoking one pack of cigarettes a day for over the past twenty years. The patient reports taking no other prescribed medications at this time. She does report taking over-the-counter allergy medications for seasonal allergies, when needed. The patient reports she currently is experiencing a great deal of stress from her full time management job, which she reports the company is increasingly demanding of her time and energy, leaving her exhausted to tend to family responsibilities. The patient states her husband's job is often unstable. He offers financial support when he can, but rarely helps out with home responsibilities or caring for their three high school

aged children. The patient stated she hesitated seeking medical care, thinking her symptoms were due to emotional stress and would most likely subside within a few hours.

The physical examination of the patient's vital signs revealed a pulse rate of 100 beats per minute. Her EKG (an electrographic recording of the heart's rhythm) results showed a normal sinus rhythm. Respirations were 20 breaths per minute. The patient's body temperature was slightly elevated at 99.9 degrees Fahrenheit. The patient felt clammy to the touch and appeared visibly pale. Heart sounds revealed a regular rate and rhythm with occasional PVCs (preventricular contractions). An examination of the lungs showed rare end expiration wheezes. Her abdomen was positive for mild right upper-quadrant tenderness and negative for peritoneal signs. The patient's extremities feet cool to touch with no edema present.

The laboratory findings revealed a total cholesterol of 200, serum triglyceride elevated at 500, blood glucose slightly elevated at 132. A complete blood count showed the patient's white blood cell count was slightly elevated at 13.1. Hemoglobin level was 15.2. The patient's initial CPK (serum creatine phosphokinase), a specific test marker for measuring myocardial destruction), was normal. Her LDH (lactate dehydrogenase), a diagnostic liver enzyme that

measures myocardial damage) was also normal. Urinalysis was mildly positive for white blood cells, positive albumin (albumin is indicative of elevated protein levels), 2+ bacteria, and positive for hyaline casts at 11-20. The patient's chest x-ray revealed mild emphysematous changes. Normal heart size.

The physical examination revealed essentially no other known abnormalities. Her attending physician, to relieve her abdominal discomfort, gave the patient a prescription. She was told her symptoms were most likely due to stress and somatic in nature. The patient's discharge diagnosis was right upper-quadrant epigastric pain. The physician recommended she see her family doctor for follow-up treatment if her symptoms persist. The patient was released from the hospital and physician's care at 1:00 pm.

Later that same day, at 7:00 p.m., the patient returned to the hospital by ambulance accompanied by her husband. She stated the stomach discomfort and nausea had significantly increased in intensity starting approximately two hours after she returned home from the hospital. At this time, she complains of moderate to severe neck, and shoulder pain extending into the mid and upper-thoracic regions. She stated the pain feels deep and throbs much like a toothache. She also reported pain radiating down

her left arm and a significant increase in chest discomfort, which she reported was a chronic dull ache. She reported experiencing moderate shortness of breath and lightheadedness upon standing. She also expressed significant sweating and a moderate amount of clamminess. She reported she was not able to make dinner for her family due to the increasing discomfort.

Physical examination revealed the patient was visibly distressed and appeared to be exhibiting moderate anxiety. Vital signs showed a significant increase in pulse rate of 120 beats per minute. Respirations were increased at 30 and shallow. Blood pressure was elevated at 156/98. Pulse oximeter was slightly low at 91%. EKG showed sinus tachycardia, rhythm regular with non-specific ST and T wave changes in the inferior leads. Chest x-ray showed mild emphysematous changes. Normal heart size. Laboratory findings were still pending. By 7:40 p.m., the EKG monitor revealed the patient's heart was in ventricular fibrillation. The patient was intubated to open an airway. Arterial blood gases were ordered. A bolus of Sodium Bicarbonate was intravenously infused. At 7:45 p.m. the patient lost total consciousness and stopped breathing. Emergency room staff was unable to resuscitate her back to life. The patient was pronounced dead at 7:58 p.m. An

autopsy was ordered and revealed the cause of death was due to a massive inferior wall myocardial infarction. Cardiac laboratory results ordered on the patient at the time of presentation substantiated the diagnosis determined by the autopsy.

The above case scenario illustrates the problem this study addresses. Postmenopausal women are fast succumbing to early deaths of coronary heart disease because their cardiac symptoms are being over-looked, misinterpreted, misdiagnosed and therefore, mismanaged by their medical doctors. According to a recent study, "women's illness is often missed or misdiagnosed delaying treatment because women's symptoms differ in comparison to men" (Petrie, et al., 1999:2334).

The National Coalition for Women with Heart Disease (2004), drawing on data from the National Center on Health Statistics and the American Heart Association, reports that heart disease is the leading cause of death of American women and accounts for 32% of all deaths among women. They further report that 38% of women and 25% of men will die within one year of a first recognized heart attack. After a heart attack, women are less likely to receive the recognized drugs for treating heart disease including beta-blockers, ACE-Inhibitors, or Aspirin after a heart attack.

Further, the report states that more women than men die of heart disease each year and yet women receive only 33% of the recognized interventions for heart disease including angioplasties, stents, and bypass surgeries. Even more disturbing given these statistics, women comprise only 25% of participants in all heart related research.

These figures suggest that when compared to men, women are at high risk of developing and succumbing to fatal outcomes for coronary heart disease. While medical science has accumulated a wealth of information about coronary heart disease in males, perusal of any number of medical journals prior to the last 10 years shows a significant lack of research on coronary heart disease in women. Over the past 10 years, research endeavors to produce a knowledge base about female heart disease has been slow. In the United States, female representation in heart studies remains problematic. Moreover, while beyond the scope of the present research, statistics reveal race as a significant risk factor for coronary heart disease. Research reveals that African American populations, for example, are three times more at risk of developing heart disease. They are also under studied and under represented in research.

Only within the last 10 years have scientists started to look closely at sex and race as risk factors for coronary heart disease research. Although relatively small in number, research studies in these areas have been fruitful. Research has established sex-based differences in consideration of female heart symptoms and outcomes. Research geared to exploring sex differences in coronary etiologies has offered invaluable data for diagnosing and managing women's hearts. Nonetheless, clinical studies on women and coronary heart disease still lag behind studies on men.

By examining how physicians diagnose and treat female patients in comparison with male patients, this study will contribute to research on sex-based differences in the diagnosis and treatment of coronary heart disease. In addition, by comparing allopathic with osteopathic approaches to diagnosis and treatment, this study will examine the effects of the physician's knowledge base on the diagnosis and treatment of women's heart disease. By examining how female physicians in comparison with male physicians diagnose and treat female and male patients, this study examines the effects of the physician's sex on the diagnosis and treatment of heart disease among women. Finally, by focusing this study on rural physicians, this

study contributes to a lagging knowledge base on rural health.

This chapter has provided an overview of some of the key issues considered in this study. In Chapter Two I offer a review of the literature on women and heart disease. In Chapter Three I offer a brief review of standpoint theory and its connections and relevance to understanding the medical models of heart disease. Chapter Four is divided into three sections. The first section offers a discussion of the historical and contemporary distinctions between allopathic and osteopathic physicians. Section two offers a discussion of the historical and contemporary situation of female physicians. Section three discusses relevant aspects for understanding the situation of physicians in rural communities. Chapter Five reviews the methods used in this research, and focuses on the vignette model used in the survey in this research. Chapter Six presents the statistical results and a discussion of findings from the survey. Finally, Chapter Seven offers concluding remarks and a discussion on implications for policy.

CHAPTER TWO:
WOMEN AND HEART DISEASE IN RESEARCH

Introduction

The aim of this literature review is to review the history of American medical practice and to focus on the development of the male medical model. In addition, factors that may be associated with women's poor coronary heart outcomes are examined in the literature. I am specifically looking at studies that take into account a multiplicity of factors that may influence diagnosis and management of female coronary heart disease. This chapter will argue that gender is one of the factors that must be considered in assessing diagnosis and treatment of coronary heart disease.

United States public health reports reveal heart disease is the number one killer of American women (Center for Disease Control, 2004). Significantly, however, in 1995 a Gallup survey sponsored by the American Medical Women Association revealed that 80% of American women between the ages of 45 and 75 did not know that heart disease is the number one cause of death in women. Just as important, the survey included 300 primary care physicians.

Of those physicians, 32% did not know that heart disease is the number one cause of death among women (American Medical Women's Association, 2000).

Since 1996, coronary heart disease has consistently remained the leading cause of death in postmenopausal women. According to 1996 figures taken from the Women's Health Initiative, a relatively recent program supported by the National Institute of Health to study American women's health aspects, "approximately half of all coronary deaths occur in women" (Women's Health Initiative, 2004). Moreover, morbidity and mortality rates surveyed over the past four years show the number of women reported with documented coronary events is slowly declining while men's rates are improving at significant rates (Center for Disease Control, 2004; Hochman, 1999; Women's Health Initiative, 2004).

Moreover, concerning race and ethnic cardiac health outcomes, when compared to white women, African American women are three times more at risk of developing heart disease, followed closely in numbers by Hispanic women (Gillium et al., 1998; Krumholz, 1997; and Raczynski et al., 1994). This data represents a disturbing trend regarding women's coronary heart outcomes and underscores the need for further research in the little known area of

women's coronary heart disease. Recently state and federal health agencies have responded to the call making funds available for more research on female heart disease.

The current literature suggests when compared to men, coronary heart disease oftentimes may be difficult to detect in women because female heart symptoms may differ from males or mimic other medical conditions (Hochman et al., 1999; Petrie et al., 1999; Vaccarino et al., 1999; Berry, 1995). That women's cardiac symptoms often deviate from men's classic chest symptoms may point to partial explanations as to why women are referred less to cardiac specialists for invasive and noninvasive therapies.

History of the Male Medical Model

The 19th and early 20th century was an age marked by progression in all social aspects. It was also an age of economic and political transformation, a shift from mercantilism to capitalism and social democracy. It was an era shaped by reform (Verbrugge, 1988). In medicine, according to George Rosen, this period witnessed a shift in the composition of medical practitioners. Before 1882, practitioners were divided into three groups: regular, homeopathic and a mixed group of irregulars lumped together as "other" physicians (1983:38). Allopathic physicians

were referred to as *regulars*. Osteopathy emerged during this period as well, although, historically, little is written about their presence as osteopathic practitioners or their established practice styles that distinguishes them from other *irregular* groups of medical practitioners.

Allopathic Medicine

Allopathic theory and methods essentially dominated the medical profession. Medical treatment by allopaths consisted of harsh and aggressive practices that often made the patient's symptoms worsen. Some of these practices included procedures such as bloodletting, which involved venous drainage of blood from the patient to rid the body of contaminated blood. This detoxification process of the body would, they believed, lead to a cure of the condition. A substantial amount of data reveals that these harsh forms of treatments further complicated the patient's well-being and health. For instance, many patients succumbed to early deaths because of these *heroic* practices.

Allopathic physicians treat illnesses with drugs designed to produce opposite symptoms to those of the illness. Thus, patients with a failing heart would be treated with Digoxin, a drug designed to stimulate the heartbeat. Central to allopathic practices was treating

life-threatening situations through surgery. The outcome of surgical intervention however was usually met with serious infection and death due to lack of administering aseptic practices. However, the introduction of germ theory and the development of antibiotics helped transform allopathic medicine into a creditable and successful enterprise. When the American Medical Association was established in 1847, it began a process of supervising and implementing standards for medical treatment. However, notably, advanced technology in germ theory and advances in aseptic practices in surgery established medicine as a scientific enterprise. According to Conrad the rise of a science-based medicine in effect annihilated all other medical sects (e.g., the homeopathic, eclectics, botanical) except osteopaths. Advances in technology in laboratory science enabled testing of other theories and practices and enabled regulars to legitimate their practices as scientific and authoritative. Allopathic medical practice and AMA regulars were further advantaged by their monopoly over licensing. Conrad has noted that the AMAs control over licensing laws "created regular medicine as a legally enforced monopoly of practice" (Conrad, 2001:160).

In 1910, the Flexner Report on American medical education, a study commissioned by the Carnegie Foundation

on behalf of the American Medical Association, found that medical school programs were severely deficient and lacked sufficient requirements in medical education. Based on the report, stiffer requirements on allopathic medicine were instituted. Medical schools developed more strenuous requirements, entrance requirements were enforced, and professional medical examinations became standard procedure. The AMA's allopathic educational programs were based on "observation and facts" (Conrad, 2001: 166). In addition, the advancement of science and technology contributed significantly to empowering allopathic medicine and that would eventually change the overall construction of American medicine forever. And, too, astounding breakthroughs in germ theory, the development of radiology, pharmaceuticals, surgery and aseptic techniques, and specialized medicine brought about a major transformation of the professional medical practices.

By the 1920s, allopathic medicine, legitimized by the American Medical Association, became the dominant medical form of practice in the United States. The AMA had established licensing boards, specialized knowledge learned through extended systematic training, and governance over medical schools (Weitz, 2004).

Homeopathic Medicine

Homeopathy had its origins in Germany and was founded in 1810 by Sameul Hahnemann (Rothstein, 1972:152). Homeopathic practitioners practiced medicine based on the "laws of similarities" (like cures like), which meant that homeopathy prescribed in minute doses substances that would produce or mimic symptoms that caused the condition or disease, resulting in immunity and cure (1972:155-57). Most importantly, however, homeopathy focused on prevention. Homeopathy first surfaced in America in 1825 by Hans Gram and rapidly became a popular alternative to traditional centered health care (1972:160). One of the primary reasons for the rapid growth of homeopathy in the United States, cites Rothstein, "was out of public reaction to regular medicine's heroic practices": the urban middle-class was seeking an alternative to allopathic health care (1972:160). Homeopathy primarily catered to the European elite classes, which made it more appealing and desirable to upper class Americans. In addition, a vast majority of the homeopathic physicians who entered the science were from affluent backgrounds and went to some of the most prestigious schools. By the end of the 19th century, "there were approximately 10,000 homeopaths representing 8 percent of all physicians and 22 schools (Rothstein, 1972:235).

The rapid success of homeopathy was chiefly due to the rising contagious and chronic illnesses such as cholera and high mortality rates experienced by Americans who, for the most part, were at the mercy of regular medicine's *heroic* practices. Thus, homeopathy's focus on prevention was seen as a desirable alternative. Supporting data elicited by Rothstein and Rosenstein, King writes that by the mid 1800s, as a group, the regular practitioners were in political disarray and began to question their own principles and ethics as bona fide healers (1991:195). Moreover, for practitioners, the unstable economy made it difficult for them to make a go of it, especially in a highly competitive environment. The rise of the popular health movement fueled a need for regular physicians to defensively organize.

By the 1850s, talk was under way to unify the American medical profession into a professional organization. This organizational action was seen as necessary by regular practitioners for the "survival and fitness" of a progressive science. The perceived current among regular practitioners was that organized medicine would lift the standards of education of its regular practitioners. This was only partially true according to King. The forge to unite, argues King, was more likely the

result of "economic problems that only intensified the resentment between regulars and homoeopaths, putting each group in an adversarial position" (1991:195).

The eventual fall of homeopathy was the result of legislation passed in support of the allopathic medical professionals (which officially organized in 1847 and became known as the American Medical Association (AMA).

By the late 1800s the AMA received substantial political clout to finally suppress their competition with the passing of mandatory licensing laws regulated by the state. Significantly, in 1904 the AMA established the Council on Medical Education that would work to improve the educational standards of the medical profession (Cockerham, 1998:188).

Osteopathic Medicine

Osteopathic medicine differed in theory and practice from traditional medicine. Developed in 1874 by Andrew Taylor Still, osteopathic practitioners believed in studying the attributes of good health, rather than focusing only on the process of disease. They recognized the body's self-healing processes and stressed preventive medicine. In addition, osteopathic medicine focused on the relationship between misplaced bones, especially in the

spinal column and interference of circulation of blood throughout the body. Once germ theory was introduced, Still argued that spinal problems predispose individuals to infection and that spinal manipulations can help the body fight infections (Weitz, 2004). I will go into this in more detail in the chapter on osteopathic and allopathic physicians.

The American Osteopathic Association, founded in 1897, worked to obtain professional recognition within the medical field. By 1901, osteopathic doctors and medical societies were legally recognized in 15 states. By 1923, colleges of osteopathic medicine required equal years of education as those of allopathic medical colleges.

During the 1920s, osteopathic physicians began moving closer and closer to allopathic models of medical education. In part, this was due to the fact that while most states recognized osteopathic physicians, they were still required to pass examinations administered by allopath controlled licensing boards. In addition, osteopathic colleges depended on, and taught from, allopathic textbooks. By the 1930s, osteopathic medicine had begun to merge with allopathic medicine. By the 1960s, osteopaths had unrestricted privileges to practice medicine in 38 states and in all 50 states by 1970. Because of its

history with holism and its orientation to prevention as well as its focus on the patient as necessarily actively engaged in self-healing, osteopathy gained in popularity during the 1970s. During the 1970s a comeback of the Popular Health Movement reemerged with health care consumers sympathetic to osteopathic principles and treatment modalities.

Professionalization of Medicine

By the 1920s, Weitz has noted, doctors had become "the premier example of a profession" (2004:327). The mass production of professionals (individuals with advanced degrees and skills) grew substantially during this time period both in numbers and in authority.

The American Medical Association was successful in creating a monopoly for allopaths over medical practice. As Conrad (2001) has noted, the AMA secured the right to define disease and established control over how to treat disease.

Goode has noted there are two important characteristics in professionalism. One is prolonged training in a body of specialized, abstract knowledge. And, the other is the provision of a service (Cockerham, 1998:183). With the AMA's control over medical education,

they were able to standardize and institutionalize educational programs. Physicians were systematically taught established (regular) medical knowledge (Starr, 1989:445). The AMA offered science a systematic approach to analyzing aspects of health and utilized empirical data to justify theories and base predictions on factors associated with cause and effect explanations. This model, coated in a system of rational and methodological conceptualizations, would guide practical and efficient methods for preserving and controlling society's health.

Professionalization had within it the rise of the male medical model. This is because women were systematically excluded from the cause and effect medical studies, from practicing medicine, and from being members of the medical schools.

According to Sandra Harding, knowledge is both historically and socially constructed (Alcoff and Potter, 1993:65). Science is the "authoritative voice" whose members are licensed to conduct and produce knowledge about women's bodies and illnesses. This authoritative voice is significant in what feminist researchers are now identifying as intrinsically problematic in women's health care. Harding has argued, "masculine bias is evident in both the definition of what counts as a scientific problem

in the concepts, theories, methods, and interpretations of research" (1986:82). Conventional medicine is founded on the theory and principles of rational thought. In other words, the medical model is based on the systematic approach to the investigation and practices of a biological science (where cause and effect are reduced to biological elements). In contemporary medicine, the basic medical model is a male medical model.

Allopathic medicine practices medicine based on what is perceived as the "normative" body of health which is defined as "white, male, young, and in good physical condition" (Goldstein, 1995:533-537). The normative body is also referred to as the "medical model" used by physicians as the "ideal template" for interpretation, diagnosis and treatment of disease and illness. Based on this model, anybody who doesn't match the model would be considered abnormal, pathologic, inferior, weak or debilitated. It's easy to see, based on this perspective, that people of color, ethnicity and gender deviate significantly from what the medical community views as norm. Generalizations made from studies based on the male medical model thus, I argue, become a necessary area for critique.

As Laurence and Weinhouse (1994) have noted, women have been systematically excluded from research in the development of new drugs and medical technology. In 1990, the General Accounting Office (GAO) reported that the National Institutes of Health had done little to implement or monitor its 1986 policy urging researchers to include women as subjects in medical research. The key word here is urging, as they were not required to include women in their studies. The GAO "found that women were being underrepresented in studies of diseases affecting both men and women. In the fifty applications reviewed, one-fifth made no mention of gender and over one-third said the subjects would include both sexes, but did not give percentages. Some all-male studies gave no rationale for their exclusivity" (Laurence and Weinhouse, 1994). Some of the important studies that have excluded women for example are: the Physicians Health Study, a longitudinal study on the effects of daily aspirin use in the prevention of heart disease was based exclusively on 22,000 male physicians. The possible correlation between caffeine consumption and heart disease risks involving over 45,000 subjects was investigated in a study conducted by Harvard School of Public Health that included no women. More blatant and disturbing is a pilot study conducted by Rockefeller

University that investigated the effects of obesity on breast and uterine cancer on only male subjects. Upon hearing about this study, Congresswoman Olympia Snow of Maine said "somehow, I find it hard to believe that the male-dominated medical community would tolerate a study of prostate cancer that used only women as research subjects" (Laurence and Weinhouse, 1994:199-200).

The 1990 Multiple Risk Factor Intervention Trial examined mortality from coronary heart disease on 12,866 men, but no women. The Health Professionals follow-up study examined the association between coffee consumption and heart disease in 45,589 men, but no women. In 1989 the Physician's Health Study studied the relationship between low-dose aspirin therapy and the risk of myocardial infarction in 22,071 men, but no women. In 1992 the *Journal of the American Medical Association* surveyed studies of clinical trials of medications used to treat myocardial infarction published between 1960 and 1991; they found that only 20 percent of studies included women (Rosser, 1994:6).

According to studies, medical research and education fail to incorporate women into their "ideal type" model of what a healthy body is supposed to look like (Petrie et al., 1999; Herholz et al., 1996; Canto et al., 2000;

Philpott et al., 2001; Vaccarino et al., 1999; Weaver et al., 1996). As a consequence, women and racial/ethnic groups continually are subject to unfair and unjust treatment. The evidence from studies shows race, ethnicity, and gender are factors attributed to behaviors of institutional discrimination such as misdiagnosis, delayed diagnosis, misrepresentation, mistreatment, racism, sexism, medical incompetence, and lack of insurance. A rising literature of research examines the sex-biased model in relation to women's health. According to a recent study, "women's illness is often missed or misdiagnosed, delaying treatment because women's symptoms differ in comparison to men" (Petrie et al., 1999:2334). Other research shows noteworthy evidence of sex-based medicine in terms of the ramifications of women's health outcomes to coronary medications in that "women's response to treatment modalities and prescribed drugs differ from men's responses" (Weaver et al., 1996:777). As a consequence, "many women are at risk of serious side-effects or even death from drug reactions due to the course of treatment because women have not been included in the drug research" (Petrie et al., 1999:2334). Moreover, "although females tend to complain more than men and see their doctors more often than men, their doctors are still misdiagnosing, not

taking their complaints seriously or simply remaining ignorant of women's medicine" (Petrie et al., 1999:2334).

Diagnosis and Treatment

The initial presentation and interview between the physician and the patient is the main site where the male model becomes problematic. This is the most important moment of communication. As David Armstrong has pointed out, the history-taking portion of the examination is "a special form of the art of communication. It is necessarily a two-way business" (1989:239). However, he goes on to note that while this is a two-way business "it was not what the patient said, but what the doctor heard which established the reality (and accuracy) of the patient's view" (1989:239). This is a key point that needs to be examined more thoroughly and followed up in terms of gender health outcomes as it relates to the interaction process between the physician and the patient.

The Male Model and Coronary Research on Women

Classic chest pain presentation is one of the primary definitive markers associated with the diagnosis of myocardial infarction according to Canto, et al. (2000:3223). However, not all patients exhibit classic

symptoms of chest pain upon presentation. Chiefly, the absence of chest pain is a strong predictor of lower use of thrombolytic intervention. The primary objective of the Canto et al. study was to determine the proportion of myocardial infarction patients who clinically present to the hospital without classic chest pain. The second aim was to evaluate clinical factors associated with this atypical syndrome. The authors hypothesized that, when compared to patients with chest pain presentations, myocardial infarction patients presenting without chest pain would delay medical attention, would be less likely to be diagnosed with an acute myocardial infarction on initial examination, and less inclined to receive appropriate medical treatment during the first 24 hours. In addition, this study examines the association between atypical chest pain presentations and hospital myocardial infarction mortality rates.

The Canto et al. study examined a total of 424,877 female and male patients with confirmed myocardial infarction enrolled in the National Registry of Myocardial Infarction 2 (NRMI-2) from June 1994 through March 1998 at 1,674 participating hospitals. The NRMI-2 program is designed to collect, analyze and report hospital data on patients admitted with documented myocardial infarctions.

Detection markers for identifying the chest pain variable include any symptom of chest discomfort, sensation of pressure or arm, neck, jaw pain occurring prior to hospital arrival. The detection marker for the variable without chest pain included absence of chest pain before or during admission, but accepted symptoms such as dyspnea, nausea/vomiting, palpitations, syncope or cardiac arrest. A substantial number of clinically significant variables are, in addition, measured at the time of analysis. Data is assessed using statistical analysis.

The results reveal one third of the myocardial patients presented without chest pain on initial evaluation and two thirds arrived at the hospital with symptoms of classic chest pain. Patients presenting without chest pain were older (mean age for women was 74.2 and for men 66.9), and were women (49% versus 38% for males). Those without chest pain had a higher incidence of co-morbidity (diabetes mellitus, hypertension, stroke, lower prevalence of smoking cigarettes), higher proportion of Q-wave infarction, and delayed presenting to the hospital. Physicians were less inclined to admit these patients with an initial diagnosis of myocardial infarction. More significant, patients without chest pain presentation were more likely to die in the hospital with myocardial infarction (23% versus 9.3%

with chest pain). Finally, the results reveal that lower use of thrombolytic therapy in patients without chest pain contributed to more than 28% of the higher mortality observed.

The limitations and contributions to this study are many. The authors report not using a cohort of patients without myocardial infarction as a control. Therefore, the authors could not determine the specificity or predictive value of this symptom. In addition, the sample consisted of predominately white patients. The small numbers represented by race and ethnic groups are statistically insignificant. Nonetheless, few studies have addressed the clinical significance and health outcome of myocardial infarction patients without chest pain presentation. The authors note that the presence of chest pain is not necessarily a cardinal feature in diagnosis of myocardial infarction. The major significance of this study is that it looked at differences in cardiac symptoms and presentations in females and males. This represents a positive shift in awareness that cardiac symptomology may be different for persons based on age, sex, race and ethnicity.

Herholz et al. (1996) conducted a study on coronary heart disease that included both women and minorities.

They note that past studies cite differences in treatment of women with myocardial infarction compared to men. Results from these studies suggest women are not aggressively treated: they undergo fewer diagnostic and therapeutic procedures than men. Moreover, most of the past studies have focused their attention on African American and White women. According to Herholz et al., Mexican Americans and non-Hispanic whites have not been compared with other groups. In the survey of the literature they find little is known about access and delivery of health care in this group. Additionally, less is known of potential differences in treatment outcomes among race, ethnic, and gender groups. However, the literature shows evidence of diagnosis and treatment disparities between whites and minority groups. This study examined treatment differences between ethnic and gender groups following myocardial infarction.

This hospital-based study used data obtained from participants in the Corpus Christi Heart Project from 1988-1990. The population based surveillance project monitored the number of hospital cases documenting coronary heart disease by gender and (biethnic) populations of Mexican Americans and non-Hispanic whites living in Corpus Christi. The sample consisted of residents hospitalized for

confirmed or possible myocardial infarction. Within the sample, 1,228 (90.5%) identified as Mexican American, 42% as non-Hispanic origin, and 6% as African American. Sociodemographics revealed the Mexican American population as younger, 52% were high school graduates compared with 85% of non-Hispanic whites, with lower income ($20,142 in 1990 compared with $31,966 for non-Hispanic whites), and lower status occupations (62% Blue-collar jobs compared with 36% non-Hispanic whites).

Results of the study show those Mexican Americans hospitalized for myocardial infarction were more likely to reveal co-morbidity (hypertension, diabetes mellitus and CHF). Comparison of treatment and medications at time of discharge showed Mexican Americans received less treatment than non-Hispanic whites. Males in both ethnic groups received beta-blockers and aspirin significantly more than women. Last, records indicate Mexican Americans were not treated as aggressively as non-Hispanic whites with myocardial infarction.

Significantly, there were a number of limitations to the Herholz et al. study. Of the 1,228 participants sampled, 89 died prior to discharge. Of the remaining 1,112 participants, 130 discharge treatments were not found documented in the medical records. Final analysis was

based on 982 patients. This study has significant limitations. Data was collected from medical records that may have been incomplete. Nevertheless, this study is important insofar as it contributes to a lagging knowledge base on women and minority heart research, specifically Hispanic American representation of coronary heart disease.

Philpott et al. (2001) have observed that coronary artery disease (CAD) is the leading cause of death in the USA and the UK according to the literature surveyed in this article. One of the primary symptoms of CAD coronary artery disease is the presence of angina (chest pain). Recent studies indicate angina prevalence among women is increasing. In women who present with angina, evidence from studies suggest they are less likely to be aggressively treated or referred for coronary angiographies. Those women who are referred for revascularization and angiography differ clinically from men, tend to be older, physically incapacitated, and have more than one disease process going on. Diagnostic and clinical assessment of angina diagnosis is partially based on how well the patient can describe h/er pain to the doctor. Philpott et al. argue that when compared to men, potential differences in the ways women verbally express angina symptoms may be directly related to differences in

diagnosis and treatment outcomes in women with CHD. Drawing on literature that suggests a gender component in language use, descriptions of symptoms may differ significantly between women and men. Moreover, male physicians may inaccurately interpret these language differences. Treatment of her symptoms may be taken less seriously and influence doctor's decisions regarding treatment options. Additionally, compared to men, women are less likely to take angina symptoms seriously (rather, pain becomes minimized and more likely caused by other things). In addition, women have long been told CHD is a male disease and does not affect women.

Utilizing content analysis, Philpott et al. analyzed 200 randomly selected written responses to obtain accounts representative of women participating in the ACRE study to determine if gender differences exist in the way language is used in describing angina symptoms and perceived health problems prior to angiography. Hospital nurses administered the study questions to participants and documented their clinical symptoms on 4021 (98%) of the participants. In addition, a self-administered survey questionnaire was administered to 3379 participants. Eighty-nine percent of the patients completed the survey. Survey questions were open-ended. Responses were coded and

divided into two distinct categories for analysis (based on narrative and factual discourse). Data was statistically analyzed using STATA.

The results of the Philpott et al. study are positive for gender differences based on description of symptoms. Compared to men, women were more inclined to offer a narrative report of her symptoms whereas men tended to report their symptoms as facts. Also, women tended to report angina pain in regions of the body other than the chest area. Pain locations reported by women were identified in areas of the throat, neck, jaw, abdomen, ears, and back.

In terms of the limitations of this study, the researchers recommend that administration of this study at the primary care stage may be more revealing. This is particularly important because cardiac referral (especially for women) depends on how well she can convince her doctor her symptoms are real and to be taken seriously. Few studies, if any, have examined gender differences in language use in the medical arena. This is a monumental contribution to medicine, physicians, and patients. This study, undoubtedly, is a major contribution to women's health issues in that it contributes to awareness of the importance of identifying sex differences in areas of

medicine where medical diagnosis and health management is critical to healthy outcomes for women.

Schulz et al. (2000) documented in previous studies that African American women experience significantly greater morbidity and mortality than white women. Causal factors are linked, partially, to lower socioeconomic status. The significance of these factors however remains unclear. Schulz et al. focus their attention on women's subjective experiences of stress related to gender and racial discrimination. The aim of their study is to obtain a clearer understanding of racial differences in the subjective experience related to treatment, income, and exposure to acute traumatic life events by African American and white women.

Schulz et al.'s research draws on the current social epidemiological model that takes into account multiple factors in predicting health outcomes. Attention is given to life stressors that may exceed the adaptive capacity for humans to cope effectively. Chronic exposure to emotional strain attributed by gender and race may place persons at risk of disease. The researchers predict women in lower social class positions are more likely to experience negative health consequences due to stressors than higher-class groups of women. Variation in health status may vary

by area of residence and race. The association of area of residence by race is measured to detect differences between African American and white women. Both groups are vulnerable to gender mistreatment. African American women are doubly vulnerable by gender and race. The study was conducted in Detroit, Michigan. The researchers hypothesize women of color will be negatively affected in all categories measured compared to white women. Utilizing data sets from two large community-based studies, the total sample combined consisted of 1839 participants. Participants were categorized into four subgroups by geographic regions.

The results show when examined by race and area of residence, African American women reported significantly poorer health status than white women. Education was not a statistically significant predictor in either group. Income, on the other hand, was significant. White women reported higher incomes compared to black women. Discrimination was reported higher in blacks than whites. These results suggest that health status is strongly related to race.

A limiting factor to the study was that few low income white women were included. Low numbers of white women living in the city was blamed for exclusion in the total

analysis. In addition, data are cross-sectional. The researchers admit, results from their analysis cannot confirm, when controlling for the other predicting variables, that discrimination alone is linked to poorer health outcomes. Nonetheless, this study is significantly contributive to a sorely needed knowledge base on the interaction of gender and racial/ethnic group representation.

A couple of studies on populations without coronary heart disease (CHD) indicate myocardial infarction is clinically unrecognized at the time of occurrence. Shiliak et al. (2001) reported risk factors for unrecognized myocardial infarction include advanced age, female sex, and absence of previous angina. Populations with known CHD have not differentiated the incidence of unrecognized myocardial infarction. Individuals with CHD could have higher risk of incidence of subsequent undetected myocardial infarction compared with persons without heart disease. Knowledge about this risk for unrecognized CHD would affect educational strategies for secondary prevention.

Data collected from the Heart and Estrogen/Progestin Replacement study (HERS) was utilized to examine annual electrocardiograms to determine the risk of undetected myocardial infarction in women with coronary heart disease.

Total participants in HERS Study include 2763 post-menopausal women younger than 80 years of age having a uterus and a previous diagnosis of CHD. Participants were randomly assigned to receive estrogen/progestin dose or a placebo based dose. Participants were monitored over a 4.1-year period both by annual clinical visits and contact by telephone. Characteristics of patients with unrecognized myocardial infarction were compared with the group of individuals with clinically recognized myocardial infarctions.

Over the 4 years of follow-up, the diagnosis of undetected myocardial infarction was confirmed in 11 patients. The patients represent 4.3% of the 256 total nonfatal myocardial infarctions. Unrecognized myocardial infarction occurred in 4 women in the hormone therapy group and 7 in the placebo group. Although initially surprised, their results do not replicate other studies. The authors suggest differences between HERS and previous studies of unrecognized MI may explain the lower observed rate of undetected MI. A more noteworthy explanation may be attributed to the condition that participants in the HERS knew they were prone to ischemic events because of their CHD history and may have detected atypical symptoms more quickly.

The sensitivity of detection of unrecognized myocardial infarction using the Nova Code and visual inspection may have been diminished because 17% of the participants had Q waves in EKG patterns at baseline.

A study by Case et al. (in Riska, 2001) surveyed U.S. and Canadian medical students responses on gender bias in the diagnosis and management of patients. A total of 3,059 medical students were shown 27 vignette case presentations of patients with coronary heart disease in which the gender of the patient randomly was shown as male or female. Of their findings, both women and men students answered correctly if the sex of the patient was a male versus female. Compared to males, female students diagnosed CHD in higher rates in both male and female patients (in Riska, 2001:95).

Discussion

By 1996, coronary heart disease officially moved into first place as the leading cause of death among women in the United States. Substantial efforts to increase the public's awareness of heart disease in women are now beginning to occur. The prevalence of coronary heart disease continues to have detrimental effects on women's heart outcomes. This chapter has assessed relevant

literature focusing on coronary heart research geared to sex-based differences in response to cardiac physiology, symptomology, and the influence of race, ethnicity, gender, and socioeconomic aspects on diagnosis and treatment.

Four studies evaluated gender differences in acute and non-acute coronary heart disease presentations in relationship to clinical diagnosis and treatment of CHD in women. Using relatively large data sets in their analyses, Canto et al.'s, Herholz et al.'s, Shiliak et al.'s and Philpott et al.'s studies found diverging similarities suggesting a gender component associated with women's poor heart outcomes. Results from their research revealed more women presented to the hospital without chest pain compared to men, women were older in age and clinically sicker, women presented with higher incidents of co-morbidity than men. An evaluation of the data showed when compared to men, women were less likely to be aggressively treated for myocardial infarction (i.e., use of thrombolytic therapies and cardiac referrals for diagnostic workup), reported cardiac pain located in atypical regions of the human body (i.e., neck, jaw, ears, back and abdominal region), symptoms were often unrecognized by physicians as cardiac related, delayed seeking medical treatment, developed

secondary complications after the initiation of thrombolytic therapy, and died sooner.

Evaluating gender differences in cardiac symptom descriptions, Philpott et al.'s investigation points to potential language barriers relevant in ascertaining gender differences in the diagnosis and treatment of CHD. This impressive study evaluated differences in the ways females and males verbally expressed cardiac pain. Philpott et al. found that men express pain precisely and concisely using "matter-of-fact" terminology, whereas women tended to use words that were less factual oriented and chose words to express pain indirectly, such as in a narrative form. Philpott et al. argue, the narrative form of expression exhibited in women could minimize and/or diminish the seriousness of the cardiac complaint, causing physicians to potentially misinterpret or misdiagnose her cardiac symptoms. This study may offer some of the most important clues to date as to why women's heart symptoms may go unrecognized or not be taken seriously. It also looks at the psychosocial dynamics of the doctor/patient relationship in terms of female-male interaction. Although not noted in her study, it would be interesting to obtain information on the female physician/female patient

interaction to assess if language use is a component in this group.

Representation of race and ethnicity continues to be problematic in the majority of the studies reviewed. Results from Canto et al.'s study were taken from predominately a white sample. Herholz et al.'s study, which examined gender differences between Mexican American and non-Hispanic white women, found higher co-morbidity present in Mexican American females than whites. Compared to non-Hispanic whites, Mexican American women are less educated, earn less income and are treated differently, given less cardiac medication and referred less for cardiac diagnostic tests. These findings are echoed in Schulz et al.'s study, which revealed similar findings among women of color. Compared to white women, African American women report more life stressors related to discrimination by gender and race, income earnings and area of residence. According to Schulz, the accumulating effects of life stressors may have debilitating consequences to women's heart conditions.

Overall, the data shows evidence that women are less likely to be treated aggressively for heart disease because physicians utilize the traditional standard model of cardiac care that is based on the male medical model.

Heart symptoms, and the criteria used in diagnosing heart disease, are based on information obtained on males. The presented studies suggest a biological, cultural, race and ethnic, and gender component attributed to differences in female and male cardiac responses. These studies enforce a conclusion suggesting the medical model doctors use to manage coronary heart disease does not work for women and may help explain women's poor heart outcomes. This study argues that the gender of the patient and of the physician and race and ethnicity of the patient must be considered in the diagnosis and management of women's heart disease. The majority of studies I examined are not considering a multiplicity of factors in diagnosing and managing the female coronary heart patient. These studies suggest that the gender of the patient and of the physician, and race/ethnicity of the patient may be responsible for differences in diagnosis and management of female heart disease.

I want to conclude this discussion by focusing on the consequences of using the male medical model when treating women's heart disease. According to a few studies that have looked at sex-based differences in patient management, women often experience different symptoms, causing doctors to misdiagnose, mismanage the female patient, or delay

appropriate life-saving treatment. The male medical model dismisses females' particular symptoms as non-cardiac, and encourages physicians to look for heart disease only in men. In other words, if a male patient presents with one symptom recognized within the male medical model of heart disease that symptom is used to diagnose a heart attack, and he is aggressively treated. Because this same model does not recognize women's heart symptoms, physicians are led into other diagnostic directions.

Policy and Program Initiatives

In regard to affecting policy, plans and programs for developing new technologies are benefiting males more than females insofar as they are based on the male medical model. New technologies that do not consider a gender component may lead to hospital's introducing technologies that augment the diagnosis and treatment of heart disease in men, but have little affect on women. Because the male model points to certain symptoms as related to heart, using that male model to decide on new technologies means finding technologies that better assess male related symptoms. However, when diagnosing women, those same new technologies may have little effect, if her symptoms are unrecognized by this model. What is needed, then, is first to recognize

her symptoms, and then to develop new technologies that offer a quicker and more reliable diagnosis of those symptoms. In other words, introducing new diagnostic tools that continue to exclude women's symptoms will have little impact on her treatment outcomes.

Reform measures now mandated by the federal government to study women's health issues were, in large part, a consequence of second wave efforts demanding accountability for the absence of a female knowledge base on women's health aspects. Under the Clinton Administration, the "Women's Health Initiative" (WHI) implemented by the National Institute of Health emerged as a result of health reform in 1996. This initiative would have significant implications for regulating policy on women's health care issues (especially in terms of women's access and treatment outcomes to disease and illness). Looking at the state of women and coronary heart disease in the United States, the Women's Health Initiative found that that coronary heart disease is the leading cause of death in women, that approximately a quarter million of women die from heart disease each year and long-term clinical trials of hormone replacement therapy (HRT) and its relationship to CHD risk among women is lacking (WHI fact sheet). Moreover, research that examines race and ethnicity and coronary

heart disease suggests that women of color and ethnicity suffer higher risk of developing coronary heart disease than white women (Gillium et al., 1998; Krumholz et al., 1997; Raczynski et al., 1994; Schulman et al., 1999).

To start, federal expenditures, such as the implementation of WHI in 1996, directed at research on and for women's health are seen as having significant implications as to women's status in American's sociopolitical arenas. However, this shift in women's status (women's health becomes prioritized) has most recently been placed in jeopardy under the current Bush administration. A now burgeoning fiscal deficit has already begun imposing fiscal control over who and what gets studied. Federal and State directives at cutting costs, spending, and slashing funding has deeply impacted women's health research and, once again, research on women's health has taken a back seat in terms of priority.

The rising rates of minority representation in America will undoubtedly force more emphasis and demand towards multicultural research and health care. Given the present economic indicators, research pursuits directed at multicultural aspects and health care issues constrained.

Additional reform mandates include requiring drug companies to include women in their clinical-drug trials.

This is a very important issue in women's health care and medicine as several studies have reported numerous accounts of sex-based differences in women's drug reactions to coronary medication. In some instances, coronary drug intervention has led to death in women treated for CHD (Weaver et al., 1994). Women's development of secondary complications induced by drug therapy is the result of practicing irresponsible medicine.

Finally, on a local level, hospital centers are now mandated by the government to begin implementation of in-service (special training) programs to hospital staff on diversity issues related to health care services. This educational move is more likely a reaction to the rising shift in ethnic representation in America, teaching hospital staff aspects about racism and sexism, (inasmuch that it relates to civil liability issues). According to Oddone et al. (2001), discrimination in the health care environment has been a subject under scrutiny for years. Its original intent was no doubt a legal strategy; nevertheless, the ramifications of this act have far-reaching consequences to educating the public on multicultural diversity and teaching tolerance to differences. These educational issues are extremely important issues for the American health care system to

contend with, especially when the system's economic survivorship depends on its relationship and commitment to communities of people.

Hospitals have become a market-oriented enterprise focused on maintaining patient satisfaction. In fact, the use of patient satisfaction surveys is seen as an important marker of success in the delivery of care. Notes Oddone et al. (2001), "patients who are dissatisfied with their health care change health-care providers or 'doctor-shop' more frequently, dis-enroll from prepaid health plans more frequently, adhere less well to medical regimens prescribed by their doctors, and recall less about what their doctor has told them or advised them to do." Moreover, they add, "it is surprising then, that little attention has been paid to racial differences in many patient satisfaction studies....in fact, in one meta-analysis, it showed that only 58 percent of the studies even included race as an independent variable" (Oddone, 2001:419).

Competition in the health care industry for high quality health care services has hospital centers scrambling for ways to monopolize the market on patient appeal. Marketing strategies might include offering services in advanced cardiac technologies, or developing reputations as being the premier acute trauma center in the

region, and so forth. Hospitals are tuning into the healthcare movement, and playing on consumers demand for higher standards of care. The rising cost of health care has not stayed in pace with cost of living wages. An unstable economy, the closing of manufacturing companies and rising unemployment have significantly impacted the number of people now uninsured, and the increasing trend of hiring temporary employment offers little to no health care benefits. What this means is that medical costs and health insurance rates get inflated to meet the cost of those people whose healthcare is absorbed by the hospitals and state. According to Relman (1990) 15 percent of Americans are uninsured or underinsured. What this means is that women's socioeconomic status may be a factor in poor coronary heart outcomes in women. Unskilled, low-income women are more likely to be uninsured or under insured and less likely to receive costly diagnostic tests to rule out heart disease. Women's socioeconomic conditions factor into diagnosis and treatment outcomes for women with heart disease and ought to be considered in further research studies in understanding the complexities of diagnosis and treatment aspects on gender and heart disease.

CHAPTER THREE:
THEORETICAL FRAMEWORK

Introduction

Standpoint theory offers insights into the production of knowledge that is highly relevant to this study. Basically, this study argues that medical knowledge on heart disease has been produced by men and for men. Studies of heart have excluded women and, equally important, medical research has been largely conducted by men. Because of women's historical exclusion from medical schools and their status as second-class citizens within a patriarchal system, little research was conducted for them or by them.

Standpoint Theory and the Male Model

Dorothy Smith has argued that men's standpoint was routinely represented as universal until feminism began to challenge it. What she means by men's standpoint is knowledge that is produced through processes that excludes women and therefore, women's knowledge, experience, interests, and perspectives. In other words, it is knowledge that silences women (1987:25). Men's knowledge,

she argues, is authoritative. When she discusses men's knowledge, she is not simply talking about the knowledge of any particular men, rather she is talking about "forms of thought, symbols, images, vocabularies, concepts, frames of reference, [and] institutionalized structures of relevance" (1987:50). The production of men's knowledge has been possible because of men's ruling status within society. Men have had control over the means of producing and disseminating ideas and images, particularly control over the educational process, over the media and over critical social organizations.

Men's knowledge is the building block of what Smith refers to as the ruling apparatus. The ruling apparatus is

> that familiar complex of management, government administration, professions, intelligentsia, as well as the textually mediated discourses that coordinate and interpenetrate it. Its special capacity is the organization of particular actual places, persons, and events into generalized abstracted modes vested in categorical systems, rules, laws, and conceptual practices. The former thereby becomes subject to an abstracted and universalized system of ruling mediated by texts (Smith, 1987:108).

What Smith is arguing is that men's knowledge is written into rules, laws and various practices. Insofar as individuals are socialized into this body of knowledge, it organizes our daily practices. It shapes how an individual thinks, acts, and interprets the world. Importantly, Smith

argues that both women and men can be and are socialized into men's knowledge.

In contrast to ruling relations in which men's knowledge is produced, women's historically oppressed situation has meant that their experiences have remained largely unformulated and unformed. In terms of women's experience, there is a lagging knowledge base, a lack of "symbolic forms, images, concepts, conceptual frameworks, [and] methods of analysis" (Smith, 1987:58).

Within the medical field, men's knowledge has been universal, authoritative, and institutionalized. The knowledge produced by men in medical research has been the standard knowledge. The model for heart disease has been a male model. In addition, medical schools, hospitals and private practices have drawn on and implemented men's knowledge. This study argues that when men's knowledge is used to diagnose and treat women's bodies, misdiagnosis and missed symptoms may occur. The lack of specific knowledge about women's bodies is therefore a problem in medical practice.

Sandra Harding (1991) focuses more sharply on science and the situation of women in relation to it. She argues that the sciences have been hostile to women in past periods insofar as the production of scientific knowledge

was seen as a man's activity (1991:22). When women did enter the sciences they had to accommodate their lives to the lives of men and men's knowledge. Like Smith, Harding argues that the contributions to science have not been neutral or unbiased. Rather, what counts as knowledge and what counts as a significant contribution to science is decided by those in power. In other words, she argues that scientific knowledge is always shaped by the social values of those who produce it. More specifically, knowledge is always produced from a particular standpoint in society. In terms of the medical sciences, Harding argues that knowledge that fails to include the experiences and bodies of women in its production is "bad science"(1991:48).

Harding argues that feminist researchers must engage in a radical critique of "bad science". The women's movement of the 1970s began such a radical critique. In part, feminist scientists have brought attention to the problems of basing generalizations about humans only on data about men. This violates the very rules of theory and method of the canons of masculine produced science (1991:57). Harding argues that feminists are needed in the existing sciences for several reasons:

> to blow the whistle from within on the failures of scientists to adhere to their often expressed principles of impartiality, disinterests, value-

> neutrality; to draw into their agendas "prefeminists" in the sciences (male and female) who are open to their criticisms of science; to gain for women access to the status and authority in the larger society that such positions bring; where possible, to explain what women need to know about the regularities and underlying causal tendencies of nature and social life; to generate, within equal opportunity justifications, scientific projects that are specifically in women's interests (1991:75).

What women in science must do, in other words, is create new knowledge, knowledge based on women's experiences, bodies and interests.

Over the past ten years, feminist medical research on coronary heart disease has addressed the types of problems Smith and Harding point out. Medical research has begun to focus attention on the inclusion of women in medical studies of coronary heart disease and is in the process of developing specific models of female heart symptoms. This research draws on female models of heart symptoms. A case study that employs a female model of heart is used as a tool for understanding whether or not the knowledge that physicians draw on to diagnose and treat women is adequate for her symptomology.

The Standpoint of Physicians

The knowledge base on which medicine is predicated is characterized by highly specific vocabularies, practices

and rules. In addition, medicine is organized to limit access and specify requirements for entry into the field. As Goode and others have recognized, medicine is professionalized. In terms of knowledge, medicine is a sub-world of role specific knowledge that is institutionally defined (Berger and Luckmann, 1966).

For any particular individual socialized into this world of knowledge, she or he shares knowledge with a social group and sees the world and engages and practices from that situation. His/her knowledge, then, is situated knowledge. Individuals are knowers whose perspectives are organized by structures of knowledge that define a ruling apparatus (Smith, 1987:65). To obtain this specialized knowledge, individuals must go through a process of secondary socialization (Berger and Luckmann, 1966). They must engage in specialized training within organizations designated by the ruling apparatus (Smith, 1987).

Hall (1996) has argued that organizations are powerful tools of the powerful. People in organizations, and the organization as a whole, get power through control of power resources. Access to positions, and access to knowledge and expertise, are power resources. Within the medical profession, women's access has been historically restricted.

The American Medical Association has long been the organization in control of medical knowledge and practice. Through its control over medical schools, licensing and admission processes, it has been able to specify what knowledge is taught, considered appropriate, and used in practice. Importantly, the American Medical Association has historically been male dominated. Women's admission into medical schools has been restricted and their participation in medical research as subjects and researchers has been limited. Therefore, women's representation and participation has been limited.

Only since the 1970s have women gained entry in large numbers into medical schools and begun to participate as medical researchers. During this period of time they have been instrumental in producing new knowledge and in transforming medical practice.

In conclusion, as Starr (1982), Walsh (1977), Verbrugge (1988), Vertinsky (1994), Barlow and Powell (1984), and others have recognized, the medical profession has historically been male dominated. With the rise of feminist research and the second wave of women's movement, new knowledge, incorporating women's experiences, bodies and issues has been slowly produced. Today, a recognized body of knowledge on women's heart, produced at the demand

of feminist scientists, is available. Research indicates that medical schools have begun to draw on and incorporate this knowledge into their curriculums. Whether a physician is an allopath, osteopath, male or female, or rural, this knowledge is available. The question is whether or not this new knowledge is being transmitted to medical students during their socialization process. What this research is designed to study is whether this new knowledge on women's bodies and women's hearts is being used by physicians to make decisions about patient's heart symptoms.

Through the construction of a survey that employs a female model of coronary heart symptoms, this study compares how physicians socialized in the two major schools of medicine -- allopath and osteopath -- diagnose and treat women's heart disease. In addition, it compares how women physicians and male physicians diagnose and treat women's heart disease. Finally, little is known about the knowledge base and practices of rural physicians in regard to women's coronary heart disease. This study specifically focuses on rural physicians and contributes to a much-needed knowledge base.

CHAPTER FOUR:
THE PHYSICIANS

Introduction

This chapter offers an in-depth discussion of the differences in knowledge base of allopathic and osteopathic physicians, of the differences between women physicians and male physicians, and of the particular situation of rural physicians. In addition to offering insights into specific practices, this discussion offers a rationale for including these differences as variables for study. Section One examines types of medical schools and draws out distinctions in the education and practices of allopaths and osteopaths. Section Two examines the position of women physicians within a male-centered enterprise and gives specific attention to the practices of women physicians in comparison with men physicians. Section Three examines issues of rural health and gives pointed attention to allopathic and osteopathic practitioners in rural areas and to the specific contingencies rural practitioners confront in their medical practices.

Part One: Allopathy and Osteopathy

Allopathy

Within the United States, there are currently 126 accredited medical schools teaching allopathic medicine (U.S. News and World Report, 2004). Allopathic medicine approaches health from the scientific perspective of a biological model that structures disease to a physiological locality. Disease is validated and affirmed by identifying the biological agent causing the symptoms. A critique of this perspective is that it does not take into account non-biological causes to disease such as emotional factors, environmental factors, and biographical factors. In other words, if the physician was unable to locate the causative agent to a biological component, then the patient's symptoms would be considered non-somatic in nature or unrelated to diagnosis. The body is thus viewed as separate from the person and the doctor is trained to isolate salient information about the sick body from the sick person. In other words, the sick person becomes a medical case.

The biological model used in allopathic medicine is also known as the medical model and separates the mind and body and excludes symptoms that are not consistent with the model. The medical model is based on viewing the body as a

machine and on the germ theory of disease (Conrad, 2001). It is further based on scientific evidence as specified in the doctrine of specific etiology, meaning that each disease is seen as caused by a specific agent. Allopathic physicians are trained to treat symptoms and single disease entities, which can be isolated within an otherwise healthy body. The physician makes a diagnosis based on signs and symptoms and with the aid of technology prescribes treatment appropriate to the particular disease (Peterson, 1998).

From this medical perspective a limited number of biological causes are the primary source and cause of illness and disease. For example, if a cardiac patient were to present to the physician with a severe stomach ache and stomach ache was not part of the medical model of coronary artery disease, this could potentially lead the doctor to dismiss the physical symptoms as heart related and instead attribute them to a nervous disorder or to a condition unrelated to heart disease.

The allopathic educational curriculum is conducive to producing physicians with specializations in specific body systems. For example, a number of medical texts organize study of the human body by body organ systems (Jenicek, 2003; Seller, 2000; Scheibel, 1998). Allopathy has

followed the basic premise that specialization is a good thing. Specifically, allopaths focus on parts or subsystems of the body and the use of "heroic" practices to induce healing of that part or subsystem. Moreover, medical curriculums are organized and taught within this mode of body systems (cardiovascular, respiratory, renal, and so forth). Textbooks and guides to practice medicine divide the body into distinct systems with distinct diseases and distinct cures or remedial approaches. It has been noted that such divisions into distinct systems are for the convenience of education and study and that the reality of the body conforms to no such division (Peterson, 1998:54).

During the 1950s the proportion of medical students planning to be general practitioners dropped from 60 to 16 percent, while specialists went from 35 to 74 percent (Starr, 1982:355). Nevertheless it is argued that doctors are being deskilled as they become more narrowly qualified as specialists (McKinlay and Stoeckle in Conrad, 2001:176). In 1966 the trend toward specialization had become so pronounced that general practice was recognized as a specialty and received federal funding to insure that primary care would continue to be available in poor and rural areas (Fry et al., in Conrad, 2001:210). General

practitioners, according to Paul Starr, were a dwindling species. Between 1965 and 1990, the number of physicians increased from 298,000 to 586,000. Almost all of that growth was among physicians that specialized.

In 1992, 85 percent of medical school graduates specialized (Rosser, 1994:175). American medicine was overly specialized and insufficiently attentive to the needs of the poor in inner city and rural areas. Focused on bodily systems and the specific causes of disease, physicians receive little training in the humanitarian aspects of medical care. In 1984 the Association of American Medical Colleges criticized medical schools for not training medical students to the psychological and social needs of patients. As Conrad has pointed out, medical training is set up in a way that discourages humane and caring encounters between doctors and patients. Teaching emphasizes the technical aspects of doctoring, including diagnosis, treatment and intervention. The focus is on tests and technology.

Over-specialization of physician's expertise in one particular body system may affect the capacity to diagnose. What the physician considers relevant, the clues that are thought worth seeking and those that should be overlooked or discarded are important factors in the process of

reaching a diagnosis. Studies show that doctors tend to develop diagnostic hypotheses very early in the intake interview, often basing their developing diagnosis only on one or two presenting complaints (Kassirer and Gorry, 1978). Contradictory clues are often neither noticed nor sought out by physicians. Diagnosing coronary heart disease is a case in point. Mistaken diagnosis in heart disease has been attributed to an over reliance on technology and technological assessment and an underutilization of observation and other clinical skills (Zarling et al., 1983).

Treatment also depends on various factors. Physicians follow decision rules that provide a set of criteria for selecting a mode of treatment. A decision rule is based on the experiences of thousands of physicians with thousands of patients. It is the distillation of all this experience and knowledge into a simple rule. Decision rules have been tested and systematically evaluated (Ebell, 2001:2). An important part of the decision rule is the number of signs considered sufficient for establishing a care plan. Some physicians rely heavily on physical examination, others on case history, others on diagnostic tests, and others on a combination of these factors (Freund and McGuire, 1995). Decision rules are based on the best evidence available.

Unfortunately, because women's heart disease symptoms have been understudied, decision rules neglect typical symptomologies for her. For example, clinical decision rules for myocardial infarction include the usual symptoms within the male medical model: acute chest pain, age above 50, blood pressure greater than 180 systolic, EKG positive for peaked or inverted T wave changes, and/or anterior-lateral Q waves (Ebell, 2001:55). Making a diagnosis and deciding on treatment means that physicians pay attention to relevant patient attributes. For example, if two patients have exactly the same symtomology and that symptomology is clinically related to male patients but not female patients then the presenting characteristic of being male will influence decision-making among physicians. In other words, social patterns of disease affect decision-making based on social attributes of patients (McKinlay et al., 2002). Finally, McKinlay et al. (2002) have strongly argued that the socialization patterns of physicians affect physician's judgements in clinical decision making. For example, race, gender and socioeconomic biases are seldom eliminated by the use of clinical guidelines.

Physicians use the medical encounter to elicit facts relevant to a medical diagnosis. A medical history is a primary tool for diagnosis. During the medical interview,

physicians extract information relevant to diagnosis and treatment. The medical write-up is a summary that integrates and synthesizes interview information with information from the physical examination and available laboratory studies. Physicians are instructed to include only the data germane to the patient's care (Judge et al., 1998).

Osteopathy

In comparison with allopathic medicine, which has 126 accredited schools, there are 20 accredited osteopathic medical schools in the United States today. In osteopathic medicine there is an emphasis on a structural approach. The body is considered in terms of intercommunication and the binding of all body parts into a single unity. The body is an integrated body system. The normal functioning of the body rests on an understanding of the interconnectedness of all its parts. Focused on the person as a whole, the body is treated as a biologic unit where all body systems are affected by a disorder by any one system (Peterson, 1998). The body in other words is treated as a complex equilibrium system that constantly attempts to maintain equilibrium and balance. Therefore, in osteopathic medicine, there is an emphasis on the

treatment of the patient as a whole. Holism means that the individual is more than the sum of all body parts. Instead of treating specific symptoms, the whole person is treated (Carey et al., 2003).

In 2002, Johnson and Kurtz conducted a survey of osteopaths and found that 41 percent described their approach as holistic (2002:2143). In addition to holism, 72 percent of osteopaths identified their treatment approach as a distinguishing feature of their practice. That treatment approach included osteopathic manipulation therapy (OMT), a caring doctor-patient relationship and openness to alternative forms of treatment (Johnson and Kurtz, 2002:2144).

Osteopathic medicine is the practice of 'rational' medicine based on the medical sciences. Like MDs, DOs are "complete" physicians. DOs take the same examination of licensure as do MDs and they are qualified and licensed to practice medicine in all recognized branches in the healthcare system. Osteopathic medicine receives equal recognition with allopathic medicine in all federal legislation related to health care. DOs practice in every state within the United States. DOs are licensed to prescribe medications and to perform surgery. Currently,

DOs comprise 5.5 percent of all U.S. physicians (Michigan Osteopathic Association, 2003:2).

There are three distinctions between osteopathic and allopathic physicians. First, osteopaths receive additional training in diagnosis and treatment under a holistic model. Danto and Kavieff (1999:168) recognize that the content of medical training is taught from the same textbooks and journals as is allopathic medical schools. The difference is in the DO philosophy of treating the *whole* patient. Osteopathic practices and principles include four basic notions: one, the body is a unit; the person is a unit of body, mind and spirit. Two, the body is capable of self-regulation, self-healing, and health maintenance. Three, structural and function are reciprocally interrelated. Four, rational treatment is based on an understanding of the above principles (Gevitz, 2004). Goldstein et al. (1987) has reported an over-representation of osteopaths in the American Holistic Medical Association. In comparison with their number, then, a great majority of DOs have further links with established holistic organizations.

Another distinctive feature of DOs is the use of Osteopathic Manipulation Therapy (OMT) in medicine as an aid to healing. The underlying theoretical principles of

OMT is that it works by freeing the spinal column of vertebral displacement and nerve impingement thought to cause disease and illness. OMT restores the natural balance of the musculoskeletol system freeing vascular pathways conceived as central to maintaining a strong and healthy body.

Given their holistic approach, more emphasis is given first to general medicine and second to specialization. More DOs become primary care physicians and tend to move to small towns and rural areas because smaller community hospitals in rural areas have less specialized and more general practitioners. Therefore, smaller rural hospitals are more suited to the interests and training of DOs. While osteopaths are only 5.5 percent of all physicians they account for 15.3 percent of physicians in rural counties. Of the 983 DO graduates between 1995 and 1999, 27 percent of them located in communities of less than 25,000. Osteopathic medical colleges "emphasize primary care of rural and underserved populations as part of their mission, and most require rural clinical rotations" (Tooke-Rawlins, 2000:299-300). Others have argued that one of the major differences between DOs and MDs is that DOs, collectively, have a mission to better serve the health of their community members (Korr, 1990; Gevitz, 2004).

Osteopathic medicine emphasizes a close and personal relationship between the physician and patient. They believe that good medical practice demands "intelligent collaboration" between the physician and the patient. A comparison study of allopaths and osteopaths by Carey et al. (2003) found that osteopaths more often engage in conversation with the patient regarding the patient's emotional state, personal experiences and activities.

Most importantly, Carey et al. (2003) found that the osteopath's review of systems includes a review of diagnostically unrelated areas and that the examination includes an examination of unrelated areas. Therefore, the holistic approach was found to have an affect on diagnosis.

In both schools, medical students may or may not be exposed to the new knowledge, or they may be exposed to it and not use it in their approach to heart. It is not just the textbooks (DOs are taught from MD texts), it is how those textbooks are used that is key to understanding the issues of women's heart. Also, osteopathy has a history and a mission to serve under-served communities, to practice equality, to look at the whole person. So, it is all these factors as well that distinguishes MDs from DOs in terms of how they approach their medical practice

styles. It is important to reiterate, however, that DOs get extra training in holistic health practices.

Rationale

It was hypothesized that allopathic physicians would diagnose female and male heart at lower rates than osteopathic physicians. In addition, it was hypothesized that allopathic physicians would order tests related to heart at lower rates than osteopathic physicians. Because allopathic physicians are trained to isolate disease causes and focus on single systems, allopathic physicians would be less likely to seek out symptoms that deviate from the male model of heart. Because the history of allopathy is tied to powerful educational structures, allopathic schools would be slower to integrate new female models of heart into their curriculums. In addition, allopathic physicians have been criticized for dismissing patient complaints as unreliable and unnecessary information. Historically, allopathic physicians, primarily male, have dismissed "women's complaints" as insignificant or unimportant (Vertinsky, 1994; Walsh, 1977). Therefore, allopaths would dismiss symptoms as extraneous that are related or symptomatic to female heart disease.

In contrast, it was hypothesized that osteopathic physicians would diagnose female and male heart disease at higher rates than allopathic physicians. In addition, it was hypothesized that osteopathic physicians would order tests for heart in their male and female patients at higher rates than allopathic physicians. Because osteopaths are trained in holistic health, this study hypothesized that they would look for a multiplicity of symptoms in both their female and male patients at higher rates than allopathic physicians. Because osteopathic physicians have a long tradition of serving under-served communities and populations, it was believed they would be more sensitive to the particular issues surrounding women and heart disease and would therefore diagnose at higher rates than their allopathic counterparts. There is also evidence that osteopaths engage in more personal relationships with patients and that they would attend to patient symptomologies in greater detail and would use that information to diagnose heart at higher rates than their allopathic counterparts.

Part Two: Women Physicians

A Brief History of Women in Medicine

A great deal of research examining women physicians raises the general questions about whether women physicians practice feminist politics, whether they bring a humanistic or holistic approach to medicine, and whether their styles of practicing medicine differ greatly from male physicians. So, in addition to examining the male dominated paradigm in medicine, it is also important to examine the woman physician as offering different medical perspectives and approaches.

In order to understand these issues I feel it is important to start with an historical account of women in the medical professions. Women's historical exclusion from the medical professions is directly tied to the neglect of women's health in traditional research. I will then turn to an examination of contemporary issues facing women's health.

The rise and development of organized medicine, under the auspice of the American Medical Association, in the late 1800s is central to understanding the issues of women's health care. The AMA dominated the field of health care (Rosen, 1983; Rothstein, 1972). The AMA was also both the *moral* voice and *medical* voice of women's health needs

(Verbrugge, 1988; Vertinsky, 1994). Early physicians, in a society that marginalized women, were cautiously against women's participation in public arenas including education, the workforce and government (Vertinsky, 1994; Walsh, 1977; Bonner, 1992). As a consequence, women's roles were largely confined to reproduction and domestic service. Women were not full participants in society, nor were they full participants in the medical field (Walsh, 1977; Marrett, 1984; Morantz-Sanchez, 1999; Bonner, 1992). In short, women were second-class citizens in society and second-class citizens in medicine. Her second-class citizenship limited women's participation as practicing physicians and limited research on female patients. As Leavitt put it, "The argument of women's limited physical and mental capacity and the centrality of reproduction for understanding women's bodies, thus defined medical treatments and views of women's health and sickness and sustained traditional roles for women in the culture at large" (1999:7). The biological view thus promoted the stereotype that women were inferior, less capable, physically limited, and intellectually diminished created significant barriers and challenges for women entering medicine (Bonner, 1992:11).

Women's Participation as Practicing Physicians

In 1970 women constituted 8.4 percent of medical school graduates. By 1990 women constituted 34.5 percent. By 1992 women constituted 41.6 percent of all medical school graduates. In 1990 women constituted 17 percent of all physicians. By 1998 women constituted 23 percent of all practicing physicians in the United States. It is expected that women will constitute 30 percent of all physicians by 2010 (American Medical Women's Association, 2003:1).

Physicians in the AMA were trained in allopathic medicine (Rosen, 1983; Kett, 1968). The AMA effectively barred women from obtaining medical degrees in allopathy and, therefore, from practicing medicine. Instead, many early female physicians were trained in alternative medicine, namely homeopathy and later osteopathy (Barlow and Powell, 1984). Women were from the outset, then, marginalized from medical practice and when they did obtain degrees they were outside of the major medical organization that supported physicians and their issues.

Importantly, historical research has documented that nineteenth-century female physicians educated first in homeopathy turned to existing women's organizations and clubs for support and legitimization of their medical

statuses (Vertinsky, 1994; Marrett, 1984; Walsh, 1977). It was through these women's clubs (comprised mostly of white, middle-class women) that female physicians participated in educating the public about women's health care needs. They wrote in local newspapers, farmer almanac journals, and spoke at town meetings about progressive reform in understanding women's bodies and their health care needs (Verbrugge, 1988). These physicians recognized that women were too sedentary and not getting enough exercise (Vertinsky, 1994). Instead of focusing on issues of health as something to wait and respond to as if one had no control over it, women health reformers offered women a solution, through education, of taking control over their health matters (Verbrugge, 1988). This new model embraced a proactive attitude, approaching ill health as something to prevent from happening.

What these earlier physicians pointed to was that models of health care *for women* needed to be developed. They also understood that women physicians needed to be proactive in changing the healthcare system to address the needs of women.

In the 1960s, as feminism gained political power, more and more women entered the medical profession as both allopaths and osteopaths. It is important to note,

however, that feminism embraced the more holistic approach of osteopathy and considered it a counter to allopathic authority. Again, in the 1960s medical issues were deeply embedded in larger social and cultural issues about the role of women in society. It was from this movement that critiques of medical models that excluded research on women emerged (Harding, 1986). In addition, along with female social scientists, female physicians with ties to feminism led this call.

By the 1970s, a women's health movement emerged that would challenge the medical knowledge of regular doctors and focus on issues of women's control over their own bodies. A discussion group in Boston in 1969 called "Women and Their Bodies" resulted in a manual entitled "Our Bodies, Ourselves" by the Boston Women's Health Collective that was published in 1973. That book created an avalanche of feminist response. One of the main concerns of the women's health movement was to organize health care around new knowledge and a new model. Feminists demanded services for women and access to positions of power in medicine as physicians. Women physicians, who accounted for 7 percent of all physicians in 1970, were drawn to the causes of the women's health movement (Riska, 2001).

By the 1980s the holistic aspects of the women's health movement were adopted by Health Maintenance Organizations (HMOs). Other health care organizations began opening women's health centers. Well-women care and hospital-based women's health care centers were established in most hospitals by the 1990s. In addition, feminists were successful in establishing curriculums in women's health in United States medical schools and fought for a specialty in women's health. That specialty was to have a knowledge base that was holistic and interdisciplinary. Women physicians teaching in medical schools have pushed this new knowledge base. By 1996, model centers for specialty in women's health had emerged. By 1998, eighteen national centers had been established (Riska, 2001).

In addition, the American Medical Women's Association has set up educational initiatives that train physicians in the identification of risk factors, symptomologies, treatment, and diagnosis of heart disease. They launched a Women's Heart Health Initiative in 1995 because their research had demonstrated a knowledge gap about coronary disease in women. They found that both patients and physicians had inadequate knowledge (American Medical Women's Association, 2001). Similarly, the Women's Health Initiative, formed by the National Institute of Health in

1991, began a large-scale longitudinal study on areas of female health. One of the primary areas under study is female heart disease (Women's Health Initiative, 2004).

All of this research points to gender differences in physicians as being an important component in women's health studies. The influence of feminist calls for equity, however, have had an enormous influence on all studies insofar as a study that excludes women is no longer standard practice. Female patients are now a regularized part of the research.

Contemporary Issues

Roter and Hall, reporting on a study of doctors in Boston, found little difference in the technical performance between male and female physicians. However, they did find that female doctors were far more likely to check for breast and cervical cancer in women. "When dealing with medical tasks uniquely relevant to their own sex, these women doctors may have experienced a heightened identification or empathy that led them to be more thorough" (Roter and Hall, 1992:123). With the heightened awareness of heart disease in women, I suspect that female physicians would be more aware of the possibility of their own likelihood of having a heart attack and therefore,

might be more conscious of coronary heart disease in her female patients.

The patient's sex also affected technical performance. According to Roter and Hall (1992):

> Doctors (whether male or female) treated young girls with urinary tract infections more thoroughly than they treated young boys, but the exact opposite occurred for ear infection-there, boys got better treatment. This apparent inconsistency makes sense if one takes into account which sex is more prone to these conditions. Girls are more prone to urinary infections, boys to earaches. It appears then, that doctors are likely to follow accepted procedure best when treating the sex that is "known" for the condition. Most likely this happens because the doctor expects to find certain conditions in a male (or female) patient and is more prepared to deal with them when they are found. Of course this makes no rational sense. A girl with an ear infection will suffer the same complications and possible permanent damage as a boy if the condition is not treated properly. If this hypothesis about doctor expectations is correct, we should find the same pattern in other medical conditions associated mainly with one sex. For heart disease we do. Among men and women with the same extent of symptoms, women receive coronary angiography, (a key diagnostic test) far less frequently than men do (123).

A great deal of research has focused on the male model in medicine and on the sex of the patient. Less research has focused on the sex of the physician (Riska, 2001). Considerable research has documented that women are over-represented in general medicine, family medicine, internal

medicine, pediatrics, obstetrics and gynecology (Riska and Wegar, 1993; Lorber, 1984; Riska, 2001).

A diagnostic outcome is recognized as a result of mutual interaction. Even with hard information such as x-ray or blood tests, there is still a great deal of variability in diagnosis. Physicians, in other words, negotiate a diagnosis as they listen to patients describe symptoms and engage in diagnostic strategies during the intake interview (Stimson and Webb in Brown, 1989:520).

In terms of practice styles, research has documented that female medical students and female physicians are more patient oriented than male medical students and male physicians (Riska and Wegar, 1993). In terms of time allotted for patient examinations, women physicians, according to Ginzberg, treat fewer patients per hour than do male physicians indicating that they devote more time talking with patients and responding to their concerns (in Friedman, 1994:140). For example, in internal medicine, male physicians spent an average of 19 minutes with patients while female physicians spent an average of 24 minutes with patients. Female physicians spent more time with female patients. They spent almost 6 minutes more with female patients than male physicians with females patients. In internal medicine, male physicians spent 19

minutes with male patients and female physicians spent just a little over 20 minutes with male patients (Roter and Hall, 1992).

A study by Roter and Hall (in Riska, 2001) found that female physicians use more partnership statements in their communications with patients, which encourages a patient to take a more active role in their own health care matters. During interaction with patients, female physicians engage in more partnership building and question asking. That is female physicians ask about more biomedical information as well as psychosocial information with their patients. In particular, they ask more information of female patients (Roter and Hall, 1992). Female physicians are also more likely to use textual knowledge in communicating with a patient. They also are found to be less verbally dominant than their male counterparts. Roter and Hall also found that female physicians are more likely to probe into their patient's psychosocial history.

Several studies on coronary heart have shown that on average women receive fewer services and interventions than men. Such gender bias has been attributed to male physicians being less attentive to women's symptoms and health needs (McKinlay in Riska, 2001).

On the matter of reproductive and coronary heart disease, several studies report that when compared to male physicians, women physicians are more inclined to practice preventative health measures on women. For example, female physicians order more screening tests (i.e., Pap smears and mammograms) on women compared to male physicians (Riska, 2001:93). The overall emerging pattern from these studies on physician's practice styles showed women gynecologists conducted longer physical examinations, asked fewer questions, had longer conversations with their patients, and communicated both verbally and nonverbally in a more effective manner. Male gynecologists tended to ask more medical questions and gave more medical advice (Riska, 2001:95). According to Roter and Hall, female physicians engage in more exploration of issues and placed the patient's medical concerns within a broader array of social, cultural and psychological experiences (2001:673). So essentially, female physicians are trying to place their female patient's experiences within the context of their lives and experiences. In short, female physicians engage in a holistic approach to their medical encounters with patients.

Kurtz et al. (2003) found that female osteopathic physicians were four times more likely than male osteopaths

to discuss alternative forms of medicine with their patients which included vitamin and mineral supplementation, lifestyle diet, massage therapy, homoeopathic preparations, acupuncture and relaxation therapy. In addition, female physicians were nearly three times more likely than male physicians to refer patients to alternative medical treatment. Finally, younger physicians were more likely to discuss and recommend alternative forms of treatment.

Lorber (1984) compared men and women physicians on how they talk about their values as physicians and their accomplishments as physicians. She found that male physicians spoke only of their technical skills and the choices of appropriate treatment they make. Women physicians, on the other hand, stressed the importance of their relationship to patients and more often used the words "help" and "care" (in Cockerham, 1998:181). Martin, Arnold and Parker have argued that men and women physicians have similar skills including both diagnostic and therapeutic skills, but differ in their communication styles. They found that female physicians tend toward empathetic and egalitarian interactions with patients and expressed more respect for patient concerns and their

psychosocial lives (Martin, Arnold and Parker in Cockerham, 1998:181).

Why is this topic important to this study? Female physicians look for and take in more information on patients. In general, they have an expectation for eliciting a wider variety of information from their patients, particularly female patients. So, in terms of the survey research, when they're looking at the vignette, they will take in more informational cues and will use that information for diagnosis and treatment. Evidence that female physicians are more attentive to the talk of women would suggest that they would take presenting complaints differently than their male counterparts.

Rationale

It was hypothesized that female physicians would diagnose both female and male heart at higher rates than male physicians. Based on the history of women's connection with holism and on contemporary ties between second wave feminism and holism, women, therefore, would consider a broader array of symptoms in diagnosing heart. In addition, the research on female physicians strongly suggests that women seek and integrate a broad array of information in their medical histories. Using this

information, this study was designed to test whether women physicians would address the vignette by seeking this broad array of knowledge and using it to make a diagnosis of heart. Research also suggests that female physicians, socialized in the feminine attributes of caring, would give more careful attention to a broad array of symptoms. Finally, research indicates that female physicians are highly concerned with issues in their patients that they themselves have or are likely to experience. It was posited, therefore, that women would be more sensitive to issues of heart in their female patients.

Part Three: Rural Health

Physicians tend to locate and practice in urban and suburban areas. As a consequence, rural areas often have a shortage of health professionals. Today, about 20 percent of the United States population lives in rural areas, but only 9 percent of U.S. physicians practice in rural areas. Osteopaths comprise 5.1% of the nation's physicians, but they comprise 15.3% of all physicians in rural counties (Simpson and Simpson, 1994). Numerous programs have been developed to address these inequities (Rosenblatt and Hart, 1999; Sammons, 2003). Simpson and Simpson (1994) report that by 1994, 30% of graduating DOs expressed a preference

for locating a practice in rural areas, while only 13.5% of MDs expressed such a preference. Significantly, 80% of all DOs in 1994 were located in just 16 states.

In urban settings, 34 percent of physicians are primary care physicians. In contrast, 45 percent of physicians in rural areas are primary care physicians. In terms of specialization then, there is less specialization is rural areas. Specialists settle in urban areas for a number of reasons including the need for a large population base, sophisticated equipment and technology and specialty colleagues (Rosenblatt and Hart, 1999:41). General Practitioners, on the other hand, are equally likely to locate in small rural areas as well as large urban areas. Women physicians tend to locate in urban areas (Rosenblatt and Hart, 1999; Simpson and Simpson, 1994). In addition, women are more likely than men to enter primary care practices (Larson and Hart, 2001:36). Four factors have been identified that make rural areas difficult to staff with physicians. First, sparse population, second, a lack of conventional, physical and cultural amenities, third, persistent poverty and fourth, high populations of ethnic and racial minorities.

All the counties in northern Michigan are classified as rural counties by the Goldsmith Classification System.

This classification system was developed in the early 1990s for the Office of Rural Health Policy in order to determine eligibility for health service grants (Ricketts, 1999:10).[1] A health professional shortage area is an area with less than one primary care physician per 3,500 people (Geyman, 2001:370).

Osteopathic medical schools have demonstrated a mission to educate physicians for rural practice. The West Virginia School of Osteopathic Medicine has focused on Appalachia. For example, 50 percent of its 1999 graduates entered primary care in rural Appalachia (Blackman, 2001:364). In Michigan, the Michigan State University College of Osteopathic Medicine launched a program in 1995 called the Upper Peninsula Medical Education Project (UPMEP). Its purpose is to connect the osteopathic program, with its long-standing mission of providing care in rural and medically underserved regions, to Michigan's Chippewa Indians in the upper peninsula. The program gives osteopathic medical students training in rural medicine and gives upper-peninsula residents needed access to health care (Kearns, 1998).

[1] See Appendix F through J for Maps outlining rural designated counties in nation-wide and Map Platte 3.1 which outlines (HPSA) health professional shortage areas.

About 60 percent of DOs become primary care physicians, practicing in small towns and rural areas. Osteopaths fill a critical need for family doctors in rural areas (Kirksville College, 2003; Gevitz, 2004).

Rural practice requires broad-based knowledge and skills (Yawn, 1994:8). General practitioners are often designated primary care physicians. Viewed in this respect then, they are the physicians typically responsible for rendering most types of healthcare services. County residents therefore seek out from their primary care providers a comprehensive array of health services such as physical examinations, treatment of ankle sprains, fractures, obstetrics and gynecology, gastrointestinal ailments, pediatrics and mental health services. Winstead-Fry and Wheeler (2001) note that while heart disease is major cause of mortality in women there is little research on women and they found no articles on rural women and cardiac disease. Many rural hospitals cannot support highly specialized services such as cardiac intensive care. In 1996 the American Hospital Association reported that only 22 percent of rural hospitals with fewer than 25 beds had intensive care units. The same study found that rural hospitals with fewer than 300 beds were less likely than urban hospitals of the same size to have specialized

diagnostic technologies such as cardiac catheterization, only 9 percent have this versus 39 percent in urban hospitals (Nesbitt and Kuenneth, 1999). Most acute rural patients are forced to go to urban centers for sophisticated diagnostic and therapeutic procedures. Of hospitals with 300 or fewer beds, only 25 percent have cardiac intensive care beds. Only 2 percent offer any kind of open-heart surgery. Rural hospitals have less than half the medical staff of comparable urban hospitals (Nesbitt and Kuenneth 1999).

Most rural hospitals are small with fewer than 100 beds. Sixty percent of all federally funded community health centers are located in rural areas. These health centers are specifically designed to provide primary health care services in medically underserved areas (Souare, 2001:316).

CHAPTER FIVE:
METHODS

Introduction

This research was designed to study the effects of medical school education and gender on the diagnosis and treatment of coronary heart disease. Specifically, it compared allopaths with osteopaths, male physicians with female physicians, and male patients with female patients. Using a vignette that incorporates female coronary symptomology, physicians were surveyed and asked to respond to questions about their diagnosis and treatment strategies.

This chapter examines the use of vignettes in medical research, surveys the literature on vignette research, and comments on the strengths and limitations of using vignettes. The chapter begins with a discussion of research questions and hypotheses. Focus then turns to operationalization procedures. An examination of the rationale for using vignettes in this study and a discussion of the case study vignette produced for the research follows. Finally, the sample and statistical

analysis procedures are discussed. A conclusion offers insights into policy implications.

Research Questions and Hypotheses

Several research questions guide this study. Each one focuses on the characteristics of physicians that may affect the diagnosis and treatment of coronary heart disease in female and male patients. The study's research questions and subsequent hypotheses follow:

1. What influence does physician's education as allopathic or osteopathic have on diagnosing female and male heart?

Hypothesis: Osteopathic physicians will diagnose female and male heart at higher rates than allopathic physicians.

2. What influence does physician's sex have on diagnosing female and male heart?

Hypothesis: Female physicians will diagnose female and male heart at higher rates than male physicians.

3. What influence does year of graduation have on diagnosing female and male heart?

Hypothesis: More recently graduated physicians will diagnose female and male heart at higher rates than less recently graduated physicians.

4. What influence does physician's education have on test ordered for heart in female and male patients?

Hypothesis: Osteopathic physicians will order tests for heart on female and male patients at higher rates than allopathic physicians.

5. What influence does physician's sex have on test ordered for heart in female and male patients?

Hypothesis: Female physicians will order tests for heart on female and male patients at higher rates than Male physicians.

6. What influence does year of graduation have on test ordered for heart in female and male patients?

Hypothesis: More recently graduated physicians will order tests for heart on female and male patients at higher rates than less recently graduated physicians.

Operationalization

To operationalize the causative factors, several variables were constructed: the vignette for the female model, type of medical degree for physicians knowledge base, sex of physician, years since graduation for measuring exposure to the female model in medical school, and the availability of in-house tests for limitations of rural practice. Each of these variables is discussed below.

Women's heart symptoms was operationalized using a vignette case study that offers a realistic accounting of a patient presenting with documented symptoms of women's coronary heart disease. Because of the researcher's interest in knowing whether the sex of the patient affected a physician's diagnosis, sex of patient was operationalized by producing half of the vignettes with a female patient and half of the vignettes with a male patient.

The causal factors of physician's knowledge base, sex, and exposure to feminist research on coronary heart disease were operationalized by producing several variables. Physician's knowledge base was operationalized by asking physicians to respond to a question about their type of medical degree. The physician's sex was operationalized by asking physicians to respond to a question about their sex. Possible exposure to feminist research on female heart was operationalized by asking the physician's year of graduation. This information would help determine if they had been in medical school within the past 10 years since the model was included in the medical curriculum.

Evidence of the influence of physicians knowledge base was operationalized by measuring diagnostic outcomes and tests ordered. Diagnosis was operationalized by asking physicians to rank seven possible diagnoses in order of

highest suspicion. Specific diagnoses pointed to the physician's suspicion of heart and to the use of the female model. The importance of specifying tests attached to symptoms as indicators of heart disease were operationalized by asking physicians to rank eight tests in order of importance. Specific tests pointed to the use of the female model.

The situation of rural physicians was operationalized by asking physicians to comment on tests that were not available in-house. Their situation was also operationalized by asking them to comment on tests they would like to have available.

The Case Study Approach: The Use of Vignettes in Medical Research

Alexander and Becker posit that issues of interpretational ambiguity surface in public opinion and survey research when "respondents are asked to make decisions and judgments from abstract and limited information" (1978:103). More recent literature raises these same internal and external validity concerns (Sudman, et al. 1996). Alexander and Becker argue that vignettes may resolve some of the internal and external issues associated with popular survey research methods. In terms

of addressing validity concerns with the use of vignettes as a method of research, Alexander and Becker argue that "the use of vignettes help standardize the social stimulus across respondents and at the same time make the decision making situation more real" (1978:103). They define vignettes as "short descriptions of a person or a social situation which contain precise references to what are thought to be the most important factors in the decision-making or judgment-making processes of respondents" (1978:94). Gould supports Alexander and Becker's definition, adding, "vignettes are simulations of real events which can be used in research studies to elicit subjects' knowledge, attitudes or opinions according to how they state they would behave in the hypothetical situation depicted" (1996:1).

In the broadest sense, then, vignettes can be conceived as short screenplays, having a *"made for television"* quality about them, as the construction of vignettes is most often based on real-life situations or events. So, on the one hand, this method may be appealing to researchers interested in knowing how respondents think and react to various situations presented to them. In addition, the application of different versions of the same vignette may be introduced to sample respondents in the

survey to determine the level of association between distinct variables. Thus, vignettes used as a research method often capture a wide range of interests across disciplines, especially social psychology and behavioral psychology that employ experimental research.

In some of the literature, vignette survey terminology continues to evolve and may be expressed in terms of factorial survey research. Factorial surveys, are essentially an extension of the vignette method and operate in a similar manner as the vignette. Basically, factorial surveys "consist of providing individuals with contrived hypothetical situations/objects which are to be evaluated according to some process being studied" (Rossi and Nock, 1982:10). Factorial surveys are fundamentally rooted in experimental studies, in which the environmental conditions of the situation are controlled or the presenting characteristics of symptoms in the case study remain fixed modes of expression. They are constructed using experimental design protocol "which ensure orthogonality of all components of the situations/objects" (Rossi and Nock, 1982:10). Taken from this perspective, then, vignettes may be conceived as a form of virtual reality. Rossi and Nock further add:

> Factorial surveys more faithfully capture the complexity of real life and the conditions of real human choices and judgments and at the same time provide the ability to identify clearly the separate influences of the many factors that go into such judgments and choices (1982:16).

Rossi, while working on his dissertation around 1951, was introduced to a similar version of the medical school's case vignette by his then advisor Paul Lazarsfeld who later referred to it as a "factorial designed survey" (Rossi and Nock, 1982: 9). Elaborating on the design and technique, Rossi discovered the benefits associated with the case vignette approach, especially in social judgment survey research.

Vignettes are a nice fit in medical training studies where principles and protocol practices are evaluated. Their appeal to medical educators is that they evoke, in a sense, a virtual reality of the patient-physician encounter. The vignette method has a long history in human medicine and has been widely disseminated throughout medical schools and various programs for their appeal as a pedagogical tool in medical educational training. Widely accepted as a pedagogical tool in medical training, case vignettes are primarily used to assess clinical competency, clinical judgment, medical management and conscientiousness (Anspach, 2001).

In addition to being a teaching tool in medical schools, medical researchers also employ vignette methods in their research. Vignettes, or case studies, offer the user the advantage of using hypothetical cases. Medical research often draws on already existing secondary data sets. Perusal of the literature in prestigious medical journals reveals that the majority of published articles use data collected from previous studies such as secondary data subsets. In addition, researchers perform analysis on patients' charts and case histories. Vignettes offer another alternative for research, particularly for survey and experimental studies. For example, in medical research these hypothetical cases can systematically vary characteristics of the patients and their symptoms. Because they are hypothetical, it is possible to choose patient characteristics and symptoms to accentuate certain characteristics in which the researcher is interested. Also, the vignettes can be written so that certain details are emphasized and other details omitted. Again, these inclusions and exclusions are based on the researcher's interests (Gould, 1996; Berk and Rossi, 1982).

A Survey of Literature and Research Using Vignettes

The value of using case studies, particularly written case simulations, to measure physician's decision-making and competency skills is assessed by Jones et al. (1990). A significant issue addressed by the authors is how the vignette method actually measures the physician's behavior outcomes. Can it predict physician behavior such as diagnosis and test selection? It is posited that physicians' responses to case simulations will closely model responses expressed in their actual clinical encounters. The authors raise several key problems associated with their use in research investigations:

- The absence of visual cues may be an important determinant of physician responses.
- Written case simulations may be constructed in a manner that may appear too artificial or arbitrary.
- Due to these factors, a degree of uncertainty about their validity is debatable.
- A concern for whether or not written case simulations are effective tools to adequately assess decision-making and competency.
- Problems associated with social desirability.

Referred to as the "cueing effect," physicians tend to do more on written simulations followed by response options than simulations that present patient information without stated options (Jones et al., 1990:807). Additionally, doctors may respond as they should respond, rather than as they are more inclined to do in actual practice situations (Jones et al., 1990:807).

Jones et al. surveyed 74 articles using written simulations to predict physician's behavior. Out of the 74 articles reviewed, 11 met the criteria for analysis. Criteria for selection were based on using only those articles in which a measure of behavior in actual clinical practice was compared to responses in simulated practice.

Of the 11 articles that met criteria for analysis, 5 studies showed a relatively high degree of correspondence between the behavior of interest in the simulated cases and actual practice behavior. The other 5 studies showed significant differences in the degree of correspondence between behaviors of interest in the simulation and actual practices. One study observed differences between simulation and actual. However the study did not address the determination of validity. Results would not be meaningful according to the authors who reviewed this case. The conclusions of this study were that no clear

interpretation was revealed on the performance of physicians' responses to written simulations as a useful indicator of actual judgments. The authors note, however, that this kind of method is an effective tool for attitudinal studies, evaluating recall, and the application of knowledge. It is an aid in the illumination of the decision making process.

Alexander and Becker (1978) advocate the use of vignettes in survey research. They see it as a defense against the inadequacies produced by the formulation of survey questionnaires and interviews. They argue that the questionnaire may not be a reliable technique in evaluating attitudes because of the potential bias elicited in self-reported responses due to ambiguity issues produced from the questions. In its place, they petition for an enhanced version of the case vignette design known as a fractional replication factorial design. Premised on multivariate regression, it advocates practicality and efficiency in the analysis process and alleviates some of the overlapping effects typically expressed between closely associated variables. It works by reducing the number of case vignettes normally required without losing optimal levels of information necessary for analysis. A compelling aspect of using the vignette method in the data collection process

is that it is effectively designed to measure the effects of the respondents' judgments simply by altering the characteristics of the simulated encounter presented. According to the authors, "employing systematic variation in vignette content enables the researchers to measure the determinants of respondents opinions more accurately than could be accomplished by questionnaire and interview methods" (Alexander and Becker, 1978:95). In assessing some of the pertinent benefits to utilizing the vignette method over direct questioning, Alexander and Becker cite some of the major advantages:

- The respondent is not as likely to consciously bias her/his report in the direction of social desirability as she potentially would when asked directly on how they would handle a situation.
- Most people are not consciously aware about highly correlated factors that enter their own judgment-making process.
- The sequential variation of descriptions characterizing case vignettes offers a better estimate of the effects of changes, individually and in combination, to changes in respondent judgment (1978:95).

Alexander and Becker conclude that the use of case vignettes helps control for extraneous variables across respondents and those clinical judgments and behaviors made from simulated encounters are more realistic and better predictors in explaining effects.

Skaner et al. (2000) examined physicians' judgments and competency skills in diagnosing heart failure. Heart failure is reported more often in patients who are old, presenting with higher co morbidity and express more atypical symptoms. They posited that the general practitioner is generally the initial primary caregiver of those patients presenting with heart failure. Skaner's group hypothesized that detection rates of heart failure would be different between general practitioners, cardiologists and medical residents.

Skaner et al. (2000) sampled 27 GPs, 22 cardiologists, and 21 medical residents, equally distributed by sex and age. The physicians were presented with 40 case vignettes and asked to clinically assess the patient's cardiac status. They used eight cues (variables) to describe the patients presented in the case vignettes. The number of case vignettes presented to the physicians was determined by the number of cues. The case vignettes were based on actual patient events. Using data from patient medical

reports, 26 of the cases were presented with documented heart failure. The control consisted of randomly selected patients without documented heart failure.

Skaner et al.'s (2000) findings revealed no significant differences between groups in diagnostic strategies. The results did not support their hypothesis that group differences in physician's judgments would be revealed. In addition, cue utilization varied among the physicians indicating no singular symptom is a predictor of diagnosing heart failure. According to the authors, case vignettes used in the examination of physician's decision making of heart failure offer some compelling evidence of the decision making process.

Assessing patient admission criteria by physicians and utilization reviewers in decisions regarding level of care and payment strategies in a managed care system is the focus of a study by Rosenquist et al. (2000). The authors argue that agreement between clinicians and utilization reviewers in negotiating medical care options to patients can be difficult to achieve. More often than not, the position of the utilization reviewer results in an adversarial relationship with the physician over managed care strategies. The objective of this study was to determine if case vignettes can be a useful training tool

in educating and promoting greater uniformity between doctors and utilization reviewers in making managed care decisions. The authors suggest that case vignettes offer training benefits over actual patient encounters, particularly "when the primary focus is to identify conflicts in judgment" (Rosenquist et al., 2000:1363).

A total of 31 psychiatric health providers participated in the educational training: 7 physicians, 8 utilization reviewers and 16 house officers. They were given 4 case vignettes and asked to respond to level of care decisions.

No significant differences between groups were observed in level of care decision- making. These findings suggest that physicians and utilization reviewers are competently trained in managed care decisions. However, the authors are quick to note that criterion-based admission policies and procedures restrict the range of variables selected and used in level of care decisions. Nonetheless, the authors advocate the use of case vignettes in managed care training as a competent tool in evaluating judgment skills (Rosenquist et al., 2000).

Race and sex of the patient matters, according to results of a 1999 study that evaluated physician's recommendation for patient referral to cardiac diagnostic

workup. Schulman et al.'s (1999) study explored the implication of physician's bias according to the race and sex of the patient on cardiac management.

The sample consisted of 720 physicians attending two annual national physician's conferences. Data was collected using a computerized simulated vignette survey instrument through video technology. Six computer stations were set up in a booth inside the main exhibit hall. Participants were administered a video recorded case interview of a patient with chest pain followed by questions that assess the physician's judgment of patient characteristics and the physician's clinical decision-making processes of how to manage the patient's symptoms. Eight actors representing all possible combinations of race, sex, and age were recruited to portray patients in the interviews. All actors were given the same script of presenting cardiac symptoms. Only the actors changed by race, sex and age.

Physicians were less likely to predict coronary artery disease in women than in men. Women and blacks were less likely to be referred for cardiac referral than men and whites. Black women were significantly less likely to be referred for catheterization than white men.

This study showed definitive evidence that the patient's race and sex affect the level of care and treatment rendered by physicians. This study makes a significant contribution to knowledge on race and sex differences and on studies that examine physician's attitudes and behaviors as they relate to issues of inequalities of health care.

Schulman et al.'s study, in particular, is significant to this dissertation research. I cannot over-state the excitement and joy in reading an exceptionally creative method of study undertaken by Schulman's team. Certainly, Schulman's study underscores the value of using vignettes in survey research as a valid and responsible method of inquiry in evaluating respondent's judgment processes.

Strengths and Limitations of Using Vignettes

The findings presented from these studies suggest that the use of case vignettes, especially by medical researchers and educators, is a highly regarded technique in the collection of data. Several features make it an appealing mode of analysis. First, it offers a way of collecting data that does not need to rely on secondary analysis of already existing data. The researcher, then, has more control over the research project. Secondly, it

allows the researcher to pinpoint and more accurately measure characteristics (such as age, sex and symptom variables) and examines their effects both simultaneously and independently. Third, this method has been highly recommended in studies of physician's decision-making processes. The problems with the method seem to focus on issues of internal and external validity. These problems are explored in terms of constructing the vignettes according to real world criteria. In addition, examination of these problems focuses on how existing knowledge of real world characteristics is used to portray vignettes. These issues are further examined in Gould (1996) and Jones et al.'s (1990) assessment of the validity concerns of data elicited in vignettes. Gould addresses two issues of internal validity: does the situation depicted in the vignette genuinely portray the phenomenon of interest and do the questions pertaining to the situation measure the same phenomenon. While there is tremendous value in the use of vignettes, the data collected is only as good as in how and what the data actually measures. Asserts Gould (1996), researchers need to be accountable in taking steps to establish internal validity. According to Gould, certain conditions are to be met to ensure internal validity of the vignette:

1. Has the author drawn upon existing literature or case study material to develop each of the scenarios presented?

2. Has an expert panel whose members have sufficient knowledge and experience to judge their suitability for the study vetted them?

3. Have the questions asked in relation to the vignettes been adequately pretested to extract items that are ambiguous or otherwise unsuitable?

Likewise, Jones echoes Gould's concerns on ensuring internal validity. His study evaluates literature using the vignette method to assess physician's decision-making processes. In the examination process he poses this question, Does the method actually measure the behavior outcome? It is hypothesized that physician's responses to case studies will closely agree (resemble) with their responses to actual (real) clinical encounters. Of the 74 articles assessed, only 11 met the criteria for analysis. Of the 11 articles assessed, "no clear interpretation emerged on how well physician's responses to written simulations perform as a useful measure of actual judgments" (Jones, 1990:807). He notes several of the studies did not address criterion validity. The lack of mentioning these concerns in the research is problematic as

it reflects faulty methodological design taken in the development of the data collection apparatus as well as conceptualization of method operational design aspects.

In conclusion, based on a review of these studies, the vignette model of data collection offers several characteristics that make it a strong option for addressing issues on diagnosing heart disease among women. The use of the vignette would allow for varying patient characteristics and emphasize certain symptoms documented among women as heart related. More specifically, it would allow for variation of the patients' sex.

Examination of response rates in research that used vignettes indicates their use, as a survey tool, produces favorable response rates. Gould's assessment of vignettes used as a research tool in nursing research cited a modest figure in response rate, as high as 80%. Based on the research, then, vignettes may prove to be a valuable method in conducting research.

The Medical Case History Vignette

This study employs a medical case history vignette in a mailed survey questionnaire. A *case study mailed survey questionnaire* using vignettes offers a valid and reliable

alternative to some of the conventional approaches taken in survey research.

Anspach (2001) has argued that medical case histories, whether written or verbal, follow a fairly ritualized format. Woolliscroft (1998) has observed that every medical write-up summarizes, integrates, and synthesizes information that the physician and her/his assistants have obtained during the course of the medical interview, physical examination, and from laboratory tests. The write-up consists only of information pertinent or salient to the patient's care. The medical write-up, in other words, is functional. Information included in the write-up is chief complaints expressed by the patient that led to the visit, a concise and well-organized history of the present illness, and considerations of risk factors including age, sex, ethnicity and country of origin. Finally, included in the write-up are orders and results of laboratory analysis and other diagnostic tests based on the physician's assessment.

Anspach (2001) has outlined the salient features of case history presentations. One feature is depersonalization. Physicians employ an impersonal vocabulary such as "the patient," "the infant," or "she/he". In addition, depersonalization means referring

to a disease, an organ or a system rather than a patient or person. In other words, biological processes are separated from the persons who experience them. Another feature of the medical case histories includes reports of technology-based tests such as blood tests, CT Scans, EKGs, and so forth. The results of these technologies are treated as authoritative. For example, physicians use phrases like "EKG showed" or "CBC revealed". Words like "showed" and "revealed" suggest that scientific revelation rather than interpretation is involved. In other words, negotiation and debate about what evidence means is omitted. Finally, patient's reports are treated with skepticism. For example, phrases such as patient "reports", "states", or "claims" are used and suggest that, unlike laboratory tests, which are treated as factual, these are mere subjective accounts. Further, use of such terms as "denies", as in "patient denies alcohol use" or "denies allergies" casts doubt on the validity of the patient's account (Anspach, 2001).

I followed this typical format in constructing the vignette on coronary heart disease included in the survey for this research.

Case Study Vignette Instrument

Construction of the vignette depended on several sources of information. To ensure validity, the criteria established by Gould described above was followed. First, the literature was reviewed for information about symptoms women present with in cardiac heart cases. That literature revealed a set of symptoms that were used as a base for constructing the vignette. Second, five physicians in internal medicine and cardiology who study female heart disease were consulted on the information to be included in the vignette. Third, I drew on my own experiences, which includes laboratory medicine, emergency medicine and surgery. The vignette was then constructed from these sources. Fourth, the five physicians were asked to comment on the instrument and verify its soundness. After several revisions, I then administered a pre-test (pilot study) of the instrument to 32 rural Michigan physicians. After final revisions, the following vignette was produced:

> A 52-year-old Caucasian female [male] presents to the hospital emergency room with right upper abdominal pain. Patient rates pain approximately at 5 based on a scale between 1 to 10 (1 designating least amount of pain and 10 designating greatest amount of pain). She

reports dizziness, shortness of breath, and right epigastric pain. She is positive for nausea. No vomiting. Patient reports a positive history of smoking (1pk/day for 35 years). Menses irregular with hot flashes. No medications. Physical examination reveals a blood pressure of 160/98. Pulse of 120-sinus rhythm. Respirations at 20. Body temperature of 100 degrees Fahrenheit. Patient feels clammy to touch and looks visibly pale. Heart reveals RRR with PVC's. Lungs show rare end expiration wheezes. Abdomen reveals mild RUQ tenderness. Negative peritoneal signs. Extremities feel cool with no edema. Lab findings reveal serum Cholesterol of 210. Triglyceride of 500. WBC 13.0; Hgb 15.2; and blood Glucose of 122.[2]

The instrument includes documented symptoms of female cardiac presentations. In other words, it includes the female model of coronary heart disease. The instrument is also designed to mimic or replicate an actual female case study of presenting complaints.

After reading the vignette, physicians were asked to select a diagnosis and appropriate tests. The questions

[2]See attached survey instrument in appendix E.

following the vignette were employed to measure physician's judgments.

Two versions of the vignette were produced, identical except for the sex of the patient and the mention of menses in the male vignette. The study examines whether physicians more accurately diagnose these symptoms as heart related in women in comparison with men.

Finally, this study was designed to determine if physicians base their judgment of heart disease on the patient's sex. In other words, this study would be able to determine if male patients are more frequently diagnosed with heart disease even when the symptoms are less typical for males and more typical for females. A vignette analysis offered the means to accommodate this measure. According to Alexander and Becker, "group differences in attitudes can be measured as long as there is an approximately equal distribution of the different vignette versions across the sample groups" (1978:93). In this study, two versions of the vignette, one male and one female, are distributed in equal proportions to the sample of participating physicians.

In order to assess physician's judgment in evaluating the patient, construction of two dependent variables, differential diagnosis and tests ordered were developed. What is your differential diagnosis? (Please list in order of highest index of suspicion on a 1 to 7 scale).

__ COPD

__ Cholecystitis

__ Angina

__ Pneumonia

__ Pleurisy

___ Costochondritis/Anterior Chest Wall Syndrome

What tests would you order? (List in order of importance on a scale of 1 to 8. 1 designating most important and 8 designating least important).

___ AAS

___ CXR

___ EKG

___ CPK/CK-MB

___ Troponin I

___ Gallbladder Ultrasound

___ Pulse Oximeter

___ Hemocult Blood Stool

_____ Other (Please specify:_____)

Physicians were asked to make an initial assessment, or differential diagnosis. They were also asked which tests they would order. Additional information about the patient was then offered:

Additional findings:

Further study results are obtained on this patient. Acute abdominal series show non-specific gas pattern. Chest x-ray reveals mild emphysematous changes. Normal heart size. Troponin I result is less than 0.1. EKG shows sinus tachycardia, rhythm irregular, with non-specific ST and T wave changes in the inferior leads. CPK is 215. Gallbladder ultrasound shows few echogenic shadows suggestive of Cholelithiasis. Pulse Oximeter of 94%. Hemocult Blood stool is negative.

Based on the additional information provided above would you admit the patient?

___ Yes

___ No

If you answered yes to the above question, what is your admitting diagnosis?

___ RUQ epigastric pain . . . r/o PUD

___ RUQ pain . . . r/o Cholecystitis

___ Right epigastric pain . . . r/o Pneumonia RLL

___ Atypical epigastric pain . . . r/o Anginal equivalent

___ RUQ epigastric pain . . . r/o Acute Chest Wall Syndrome

This study is specifically looking at group differences in the attitudes and knowledge bases physician's draw on to make judgments. It was posited that age and year since graduation may affect judgment and have included those variables as well. It was predicted that the type of degree a physician holds, the physician's sex, physician's age, and their years of medical practice since graduation would affect the degree to which heart was diagnosed. Therefore, this study included the following independent variables:

Independent Variables:

Professional medical license:

___Licensed M.D.

___Licensed D.O.

___Licensed Physician Assistant affiliated with licensed M.D.

___Licensed Physician Assistant affiliated with a licensed D.O.

It was predicted that osteopaths would diagnose female and male heart disease at higher rates than allopaths. It was also predicted that osteopaths would order tests related to heart at higher rates than allopaths.

Sex:

___ Female

___ Male

It was predicted that female physicians would diagnose heart disease in female and male patients at higher rates than male physicians. It was also predicted that female physicians would order tests related to hearts at higher rates than male physicians.

Age which best describes you:

___ Between 25-30 years of age

___ Between 31-35 years of age

___ Between 36-40 years of age

___ Between 41-45 years of age

___ Between 46-50 years of age

___ Between 51-55 years of age

___ Between 56-60 years of age

___ Between 61-65 years of age

___ Between 66-70 years of age

___ Between 71-75 years of age

___ Over 75 years of age

This study made no predictions for age of physician. Please write in the year you graduated from medical school:

___ Year

It was predicted that more recently graduated physicians would diagnose female and male heart at higher rates. It was also predicted that more recently graduated doctors would order tests related to heart at higher rates than less recently graduated physicians.

Years of continuous practice since graduating from medical school:

___ 1-5

___ 6-10

___ 11-15

___ 16-20

___ 21-25

___ 26-30

___ 31-35

___ 36-40

___ 41-45

___ 46-50

___ >50

Again, this study made no predictions on years of continuous medical practice.

Finally, this study was specifically geared to understand the situation of rural physicians. Availability of tests and access to diagnostic equipment is an issue in rural hospitals. To assess availability, the study asked the following questions:

Please write in the space below what tests listed above are not available to you in-house in managing this case:

_____ _____ _____

Please write in the space below any additional test[s] not listed in question two you would like considered and/or accessible in-house for use in managing this case:

_____ _____ _____

Upon examining the comments on the return surveys, the word "in-house" in the above question was ambiguous and resulted in a very wide array of interpretations. Some physicians thought it meant "in their offices" and others

thought it meant "in hospital." Even though it was meant to assess in-hospital availability, the ambiguity of interpretation rendered the question invalid. Therefore, information from these questions was not included in this report.

The Sample

The survey was mailed to a computer-generated, random selection of 700 physicians affiliated with hospitals located in 36 rural Michigan counties. The sampling frame for rural counties was determined using the list of counties designated as rural by the Michigan State Department of Community Health, Rural Health Agency. Rural counties were defined as those designated by the U.S. Office of Management and Budget as non-metropolitan statistical areas. A metropolitan area:

> consists of a core area containing a large population nucleus, together with adjacent communities having a high degree of social and economic integration with that core. Metropolitan areas generally include a city or a Census Bureau-defined urbanized area with 50,000 or more inhabitants. The county or counties that contain the large city or the urbanized area are the central counties of the metropolitan area. Additional outline counties are included in the metropolitan area if the counties meet specified requirements of commuting to or from the central counties and other selected requirements of metropolitan character. Michigan has 25 counties that have been designated metropolitan areas.

> The remaining 58 counties have been designated as non-metropolitan statistical areas (Michigan Department of Community Health, 2001:10).

Using the list provided by the Michigan Department of Community Health Rural Health Agency, I selected all rural counties that have both osteopathic and allopathic physicians north of Mason, Lake, Osceola, Clare, Gladwin and Arenac counties. These included Manistee, Wexford, Missaukee, Roscommon, Ogemaw, Iosco, Benzie, Grand Traverse, Kalkaska, Crawford, Oscoda, Alcona, Leelanau, Antrim, Otsego, Monmorency, Alpena, Charlevoix, Cheboygan, Presque Isle, Emmet, Mackinac, Chippewa, Luce, Schoolcraft, Delta, Alger, Menominee, Marquette, Dickinson, Iron, Baraga, Gogebic, Ontonagon, Houghton, and Keweenaw. All hospitals within these designated counties were randomly selected. All physicians, including physician assistants, in the designated hospitals who are osteopaths or allopaths practicing in the areas of emergency medicine, primary care, family practice, general practice, internal medicine and cardiac medicine were eligible for the study. The sample list identifying eligible health care providers were taken from the participating county's hospital directory. Data obtained from the Michigan State University College of Osteopathic Medicine, estimated the total number of eligible physicians at approximately 1250. Seven hundred

of those physicians fit the criteria for participation in this study. A list identifying participating hospitals is listed below.

Hospitals selected:

Alger County Medical

Baraga County Medical

Bay Area Medical Center

Charlevoix Area Hospital

Cheboygan County Community Memorial Hospital

Crawford County Mercy Hospital

Delta County Medical Emergency Services

Dickinson County Hospital

Chippewa County War Memorial Hospital

Grandview/Ontonagon Medical

Iosco County St. Joseph Health System

Iron County Community Hospital

Keweenaw Medical

Luce County Helen Newberry Joy Hospital and Healthcare Center

Manistee County West Shore Hospital

Marquette County Medical

Roscommon and Osceola Mercy Hospital

Alpena General Hospital

Northern Michigan Hospital

Grand Traverse County and Munson Medical Center

West Branch Regional Medical Center

Otsego Memorial Hospital

Schoolcraft Memorial Hospital

Using website directories for each hospital or county in which the hospital was located, a list of 700 eligible physicians was developed. Addresses were obtained and a mailing list was constructed. The survey was distributed by mail in November 2003. A second survey was sent in February. The surveys were returned to the Kercher Center for Social Research. Collection of surveys stopped March 7, 2004.

Survey research using the vignette method in the medical field shows variation of response rates, running anywhere from a low 15 percent to almost 90 percent completion rate. However, robust figures averaging beyond the 50 percent range must be taken in context in terms of how the method was employed. For example, if a sampling frame consists of nursing students enrolled in a summer session course work on campus, than it would be expected to yield high response rates.

The national average response rate for survey research, in general, varies between 5 percent and 35 percent. The response rate was 41.5 percent in this study.

The high rate here may reflect what Gould infers on vignettes as "an efficient method of collecting data in studies where large samples are required and contentious issues are examined or in the clinical situation where observation would be particularly time-consuming and difficult" (1996:7). The high rate achieved in this study may also reflect what may be considered an optimal setting and location for survey distribution, thus, significantly affecting completion rates and returns. In contrast, Jones et al.'s (1990) study reflects many of Gould's later concerns with validity in terms of how well the vignette measures the predicted phenomenon, which is indicative that the criterion validity of the vignette approach remains problematic. Therefore, knowledge bases become compromised if the ramifications of the method are not clearly conceptualized. If Jones et al.'s assessment is right (of the 74 articles evaluated for the validity, only 11 met the requirements for criterion validity) then, it means a significant proportion of the findings from research utilizing vignettes survey research may be meaningless.

The use of the Kercher Center for Social Research at Western Michigan University and their mailing envelopes was a method strategy to enhance response rates. The Kercher Center for Social Research is a reputable social research center directed by David Hartmann, PhD. Its use would further legitimize the importance of the survey study as a university based research project. It was predicted physicians would respond favorably to a research center mailing address. The higher than expected response rate may support this position.

Statistics

Survey data was computer analyzed using SPSS (Statistical Package for the Social Sciences). Summary statistics including bar graphs, frequencies, cross-tabulations and chi-square were the primary analytical procedures. The following variables were used in the analysis: the vignette for the female model, type of medical degree for physicians knowledge base, sex of physician, years since graduation for measuring exposure to the female model in medical school, and the availability of in-house tests for limitations of rural practice.

Benefits of Research

This study revealed whether the sex of the patient is a determinant in how physicians diagnose and treat heart disease. It also contributed to understanding whether and how the knowledge base a rural physician draws on (allopathic in comparison with osteopathic) and the availability of diagnostic technologies influences diagnostic and treatment procedures. In addition, data from this study contributes to a rural health knowledge base and the advancement of the profession. A discussion on policy implications is offered in the conclusion.

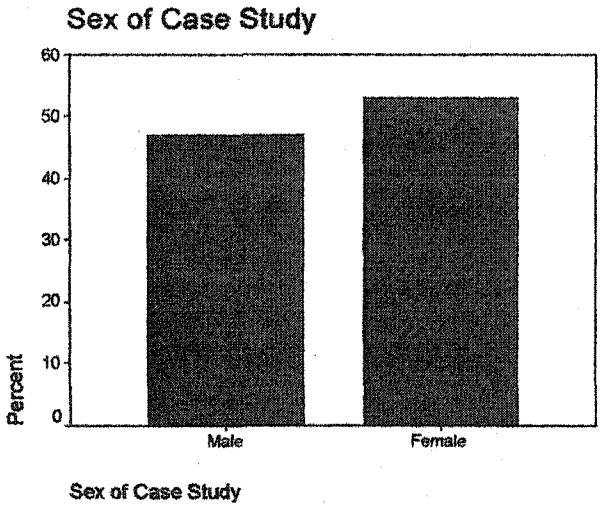
CHAPTER SIX:
DATA ANALYSIS

Part One: Frequency Results

Sex of Case Study Patients

Patient's sex was established in the vignettes by the sex of the case study included. As Figure 1 reveals,

Figure 1.



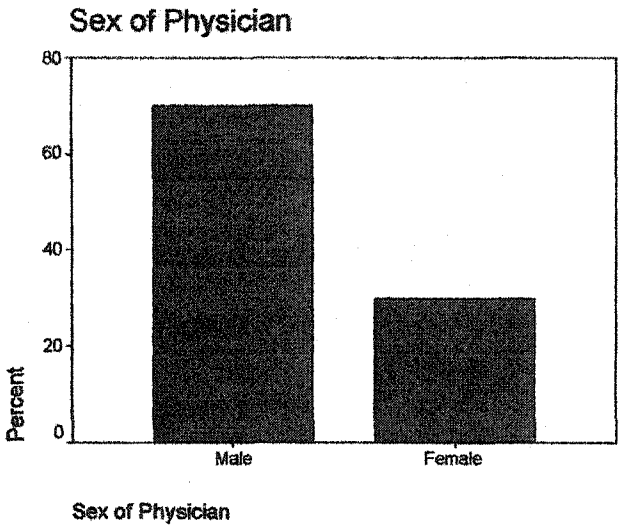
149 (47.0%) of the patients in the vignettes were male and 168 (53%) were female. This was a good representation of both male and female patients.

Sex of Physician

The sample of physicians consisted of 201 (70%) male physicians and 86 (30%)female physicians. Thirty-two cases

were non-response for the category sex. This distribution of male and female physicians represents a higher than national percentage of female physicians. Nationally, the percentage of all female physicians was 23% (American Medical Women's Association fact sheet, 2003). This higher than national average could be due to my target sample of general practice, family practice and internal medicine which have high percentages of practicing female physicians.

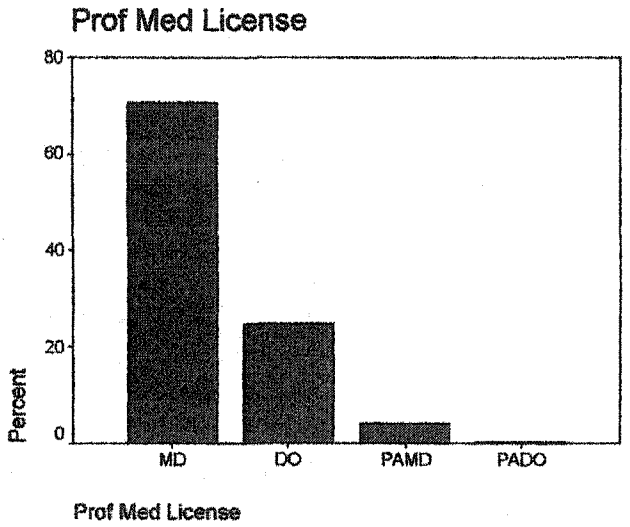
Figure 2.



Physician's Type of Medical Degree

The sample included both allopathic and osteopathic physicians. Physician's Assistants are excluded from the analysis.

Figure 3.

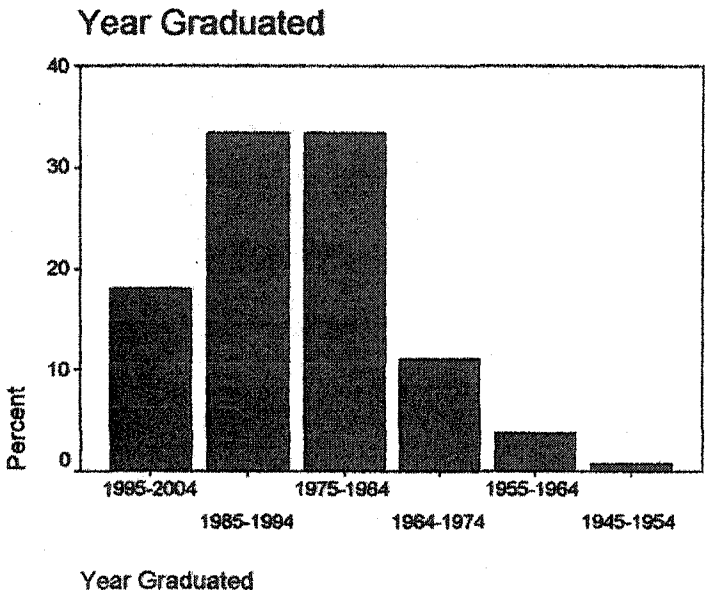


As shown in Figure 3, the sample included 214 (70.6%) MDs/allopathic physicians and 75 (24.8%) DOs/osteopathic physicians. The national average for percent of osteopathic physicians was 18%. The difference in distribution may be accounted for by the rural counties in which I sampled. DOs practice in higher numbers in rural areas. In addition, I have sampled internal medicine and family practice that have high representations of DOs.

Year Graduated From Medical School

A measure of how recently the physicians had attended medical school was obtained by their year of graduation.

Figure 4.



As shown in Figure 4, the sample included 54 (18%) of physicians graduated since 1995. The year 1995 was a significant number given that the female model has been included in medical school curriculums over the past 10 years. The sample was heavily represented by physicians with 10 to 20 years of experience; 49.8% of the physicians graduated since 1985.

Age of Physician

The physician's age was obtained to test for the effects of age on diagnostic outcomes.

Figure 5.

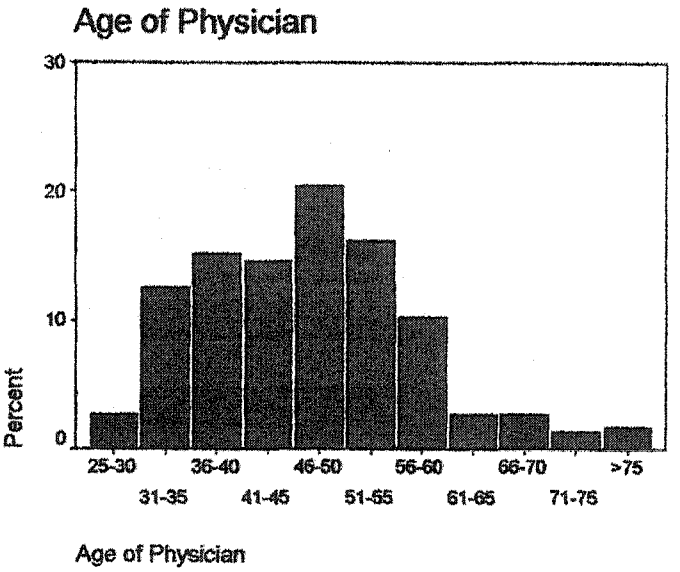
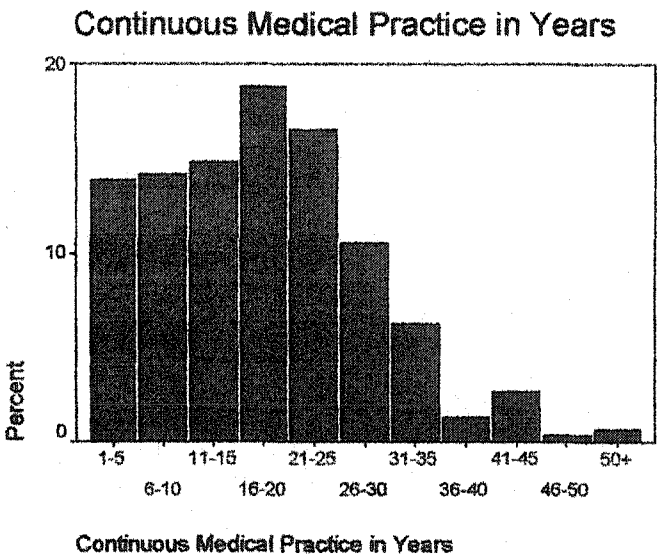


Figure 5 shows that the Age of physicians was fairly normally distributed.

Years of Continuous Medical Practice

Data was obtained on the number of continuous years the physician had held a practice. As shown in Figure 6, the physicians included in the sample have well-established practices. Nearly 62% have been in practice for 20 years or less. In addition, 14% have been in practice for 5 years or less.

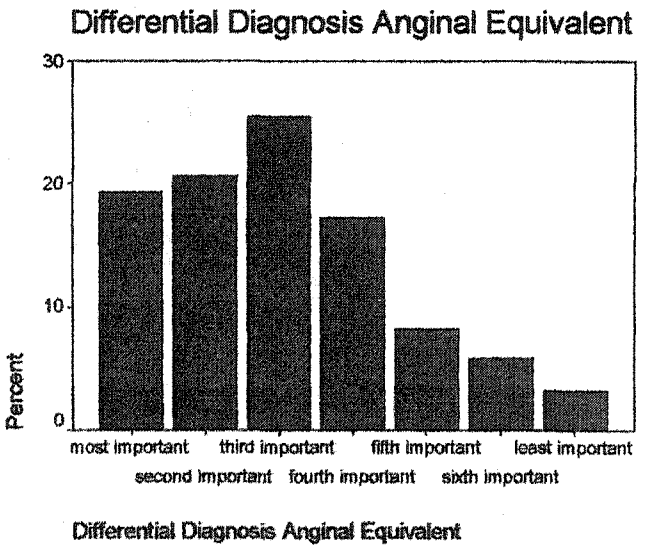
Figure 6.



Differential Diagnosis Anginal Equivalent

The physician's diagnosis of heart disease was determined by the variable for Anginal Equivalent.

Figure 7.



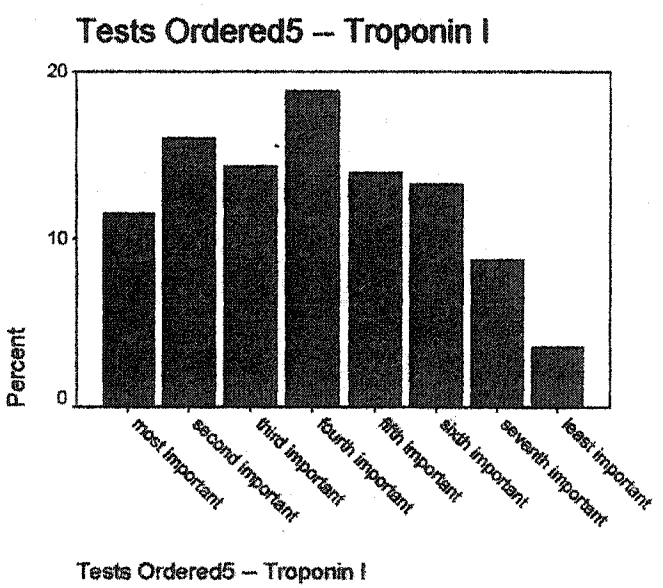
As shown in Figure 7, when considering the differential diagnosis of Anginal Equivalent, a diagnostic

indicator that the physician suspects heart, 56 (19.3%) of physicians ranked Anginal Equivalent first, or most important. It was ranked second in importance by 60 (20.7%) physicians. Nearly 83% of physicians ranked Anginal Equivalent no lower than fourth in importance. A majority of physicians, though, were suspicious of heart disease in this medical case history.

Test Ordered Troponin I

Tests for diagnosing heart disease included Troponin I and CPK-MB.

Figure 8.



Tests Ordered5 -- Troponin I

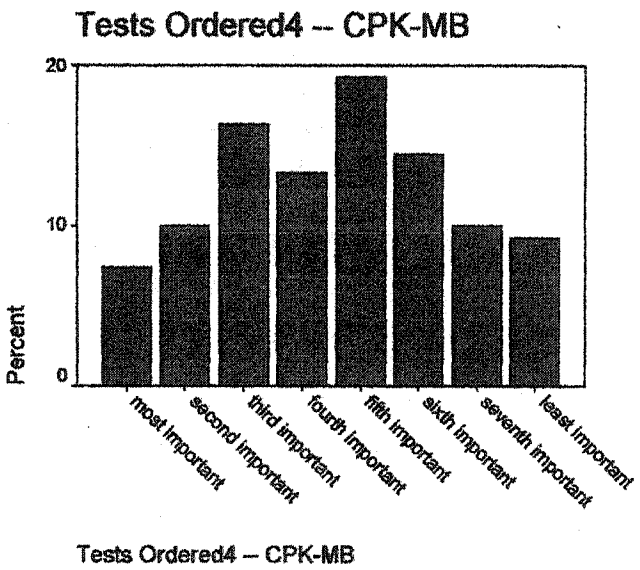
As shown in Figure 8, in this sample 33 (11.4%) of the physicians chose Troponin I, a diagnostic indicator specific to heart disease, as the most important test to

run. In addition, 46 (15.9%) chose it as the second most important test to run. Approximately 60% ranked Troponin I as one of the four most important tests to order.

Test Ordered CPK-MB

CPK-MB was the second test indicating a physician's concern with heart disease.

Figure 9.

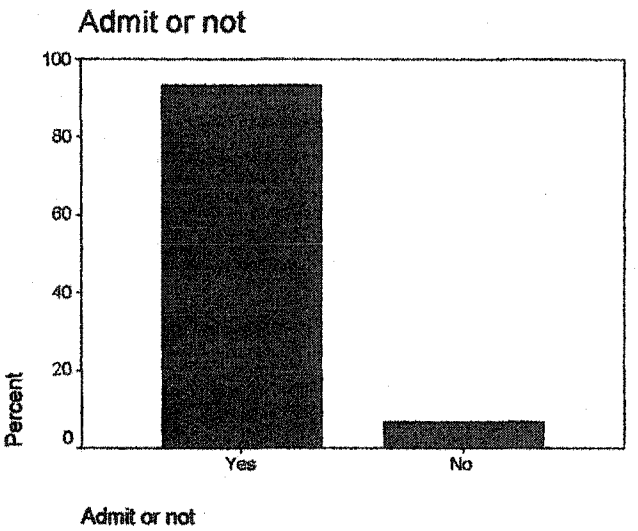


As shown in Figure 9, in this sample 20 (7.4%) of the physicians chose CPK-MB as the most important test to run. In addition, 27 (10%) chose it as the second most important test to run. Approximately 47% ranked CPK-MB as one of the four most important tests to order.

Admit or Not Admit Patient

The physicians were asked whether they would admit the patient or not.

Figure 10.

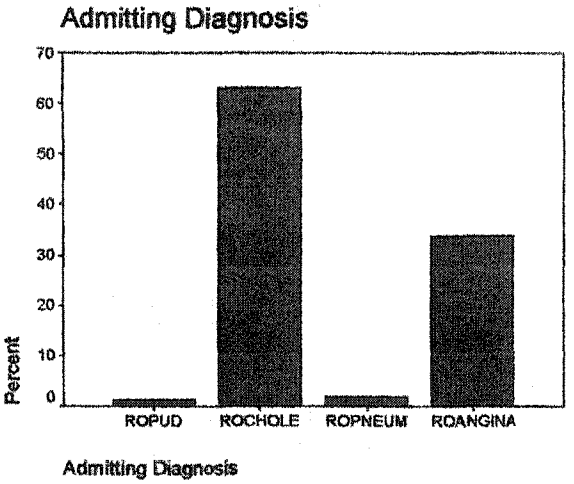


As shown in Figure 10, on the decision to admit the patient or not, 281 (93.4%) of physicians decided to admit. Only 20 (6.6%) decided not to admit the patient. This high percentage of admits by physicians indicates that the symptomology was viewed as highly significant and worthy of further evaluation.

Admitting Diagnosis

If a physician decided to admit, an admitting diagnosis was requested.

Figure 11.



As shown in Figure 11, among physicians who chose to admit, ROCHOLE, Cholecystitis was the most frequent admitting diagnosis selected by physicians at 181 (63!%). ROANGINA, Anginal Equivalent, an indicator of suspicion for heart, was chosen by 97 (33.8%) physicians.

Physicians' Written Comments

The variable on differential diagnosis provided space for physicians to write in their comments. It is very important to note that of the 53 physicians who provided comments, several physicians made the suggestion that Pulmonary Embolism be included in the list of possible diagnoses. A limitation of the instrument may be that the list of possible diagnoses was incomplete.

The variables on tests ordered also provided space for physicians to write in their comments. It is important to

note that many physicians raised the question of what "AAS" referred to. In short, that test name was not familiar to many of them. This is a term familiar to older physicians but unfamiliar to younger ones as it has been dropped from current vocabulary. Although not a limitation to the instrument, this finding does point to recent changes in medical school practices and terminology. Finally, many physicians suggested that the instrument include as possible tests a CT scan and a liver profile.

Physicians were also provided a space to comment on the variable to admit or not. All of the comments except for one were comments about why they said they would admit the patient or why they were unsure about whether to admit. In other words, they were justifying their decision to admit or explaining why they were not sure. For several physicians, the need for observation was stated.

On the variable admitting diagnosis, the physicians were provided a list of possible admitting diagnoses and were asked to choose just one. Several physicians however, wrote in a second diagnosis that was very often cholecystitis (which was one of the possibilities). In other words, they wanted a primary diagnosis and a secondary diagnosis to rule out. This is consistent with physicians' decision-rule process.

Finally, I left a space for extra comments for physicians to write in. Comments ranged from physicians elaborating on how they would further manage this patient to asking more in-depth questions about the patient's symptoms.

Part Two: Hypotheses

Hypothesis One

The first hypothesis was: Female physicians will diagnosis female heart at higher rates than male physicians in both male and female patients.

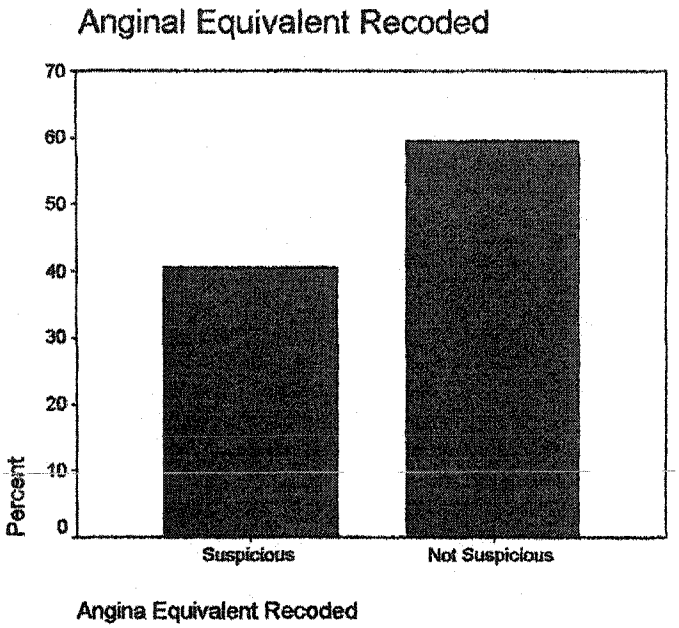
It was expected that female physicians would diagnose heart at higher rates. Women physicians have a history of practicing holistic medicine. Research documents that women look for and include a greater array of symptoms and women physicians are reported as especially concerned about female heart because they link it with their own experiences as females. Finally, feminists have pointedly reached out to educate women about heart disease.

The variable for diagnosing heart was differential diagnosis Anginal Equivalent. Anginal Equivalent was the diagnosis that would indicate a physician is suspicious of heart. The original variable was ranked with seven categories from Most Important to Least Important.

Crosstabulation revealed insufficient cell counts. Therefore, Anginal Equivalent was collapsed into two categories with 1-2 recoded as Suspicious and 3-7 recoded as Not Suspicious of heart. This was consistent with physicians' practice of listing more than one diagnosis as they engage in the process of decision rules. Typically, physicians will work with two or three possible diagnoses and will run tests and conduct other investigative procedures to determine which one is correct. In this case, all cases that ranked Anginal Equivalent as their first or second diagnosis were recoded as Suspicious of heart.

As Figure 12 reveals, 40.5% of physicians were suspicious of heart. In other words, less than half of all physicians considered the patient's symptoms as heart related. In contrast, nearly 60% were not suspicious of heart.

Figure 12.



N=269
Missing N=20

In an effort to tease out the relationship between differential diagnosis and test ordered, I performed two separate procedures. I was interested in knowing if the physician who ranked differential diagnosis Anginal Equivalent as low as "4" would also order a test to rule out that possible diagnosis. In other words, I was interested to know what a ranking of "4" meant in terms of the physician's decision-making process. Therefore, I selected only cases who ranked anginal equivalent as "4" and ran a crosstabulation with test ordered Troponin I. I found that when the diagnosis was ranked as low as "4", only 4.2% of physicians considered the Troponin I test for

heart as Most Important and only 8% ranked it second. Importantly, nearly 20% ranked the test in the bottom three tiers. For the test CPK-MB, the findings were similar. Only 6.7% of physicians selected CPK-MB as Most Important and only 4.4% ranked it second. Even though physicians ranked Anginal Equivalent as a fourth possible diagnosis, nearly 25% would either not order a test to rule it out or ranked it in the two lowest categories. On the other hand, when differential diagnosis Anginal Equivalent is ranked number one, 45% of physicians selected Troponin I as the first or second test and 30% ranked CPK-MB as first or second.

Table 1. Physician's Sex by Recoded Differential Diagnosis Anginal Equivalent Layered by Sex of Patient

Sex of Physician * Angina Equivalent Recoded * Sex of Case Study Crosstabulation

Sex of Case St				gina Equivalent Recod: Suspicious	Not Suspicious	Total
Male	Sex of Physici	Male	Count	38	53	91
			Expected Count	36.4	54.6	91.0
			% within Sex of Phys	41.8%	58.2%	100.0%
			Residual	1.6	-1.6	
		Female	Count	12	22	34
			Expected Count	13.6	20.4	34.0
			% within Sex of Phys	35.3%	64.7%	100.0%
			Residual	-1.6	1.6	
	Total		Count	50	75	125
			Expected Count	50.0	75.0	125.0
			% within Sex of Phys	40.0%	60.0%	100.0%
Female	Sex of Physici	Male	Count	34	63	97
			Expected Count	39.5	57.5	97.0
			% within Sex of Phys	35.1%	64.9%	100.0%
			Residual	-5.5	5.5	
		Female	Count	25	23	48
			Expected Count	19.5	28.5	48.0
			% within Sex of Phys	52.1%	47.9%	100.0%
			Residual	5.5	-5.5	
	Total		Count	59	86	145
			Expected Count	59.0	86.0	145.0
			% within Sex of Phys	40.7%	59.3%	100.0%

N=270
Missing N=49

Table 1 (Continued)

Sex	Pearson Chi-square	Significance level	
		(2-sided)	(1-sided)
Males	.431	.545	.328
Females	3.860	.072	.038

As *Table 1* revealed, 52.1% of the female physicians were suspicious of coronary heart in female patients compared to 47.9% who were not. Among male patients, 35.3% of female physicians were suspicious of coronary heart disease compared to 64.7% who were not. Responses among male physicians showed 35.1% were suspicious of coronary heart in their female patients compared to 64.7% who were not. Among male patients, 41.8% of male physicians were suspicious of coronary heart disease compared to 58.2% who were not. When the physician is female and the patient is female, the expected count is 19.5 and the actual count is 25 leaving a residual of 5.5. When the physician is female and the patient is male, the expected count is 13.6 and the actual count is 12 leaving a residual of -1.6. Female physicians, then, over-diagnose female patients with heart disease and under-diagnose male patients. When the physician is male and the patient is female, the expected count is 39.5 and the actual count is 34 leaving a residual of -5.5. When the physician is male and the patient is male the expected count is 36.4 and the actual count is 38 leaving a residual of 1.6. Male physicians, then, under-diagnose female patients and over-diagnose their male patients. As hypothesized, female physicians diagnose heart in female patients at higher rates than did male

physicians, but they did not diagnose male patients at higher rates. Rather, as hypothesized, male physicians diagnosed females at lower rates and diagnosed males at higher rates. The Pearson chi-square value for male patients was .431 with 1 degree of freedom and was not statistically significant at the P value of < .05. For female patients, however, the Pearson chi-square was statistically significant at the P value of < .05 with a value of 3.860 with 1 degree of freedom.

Hypothesis Two

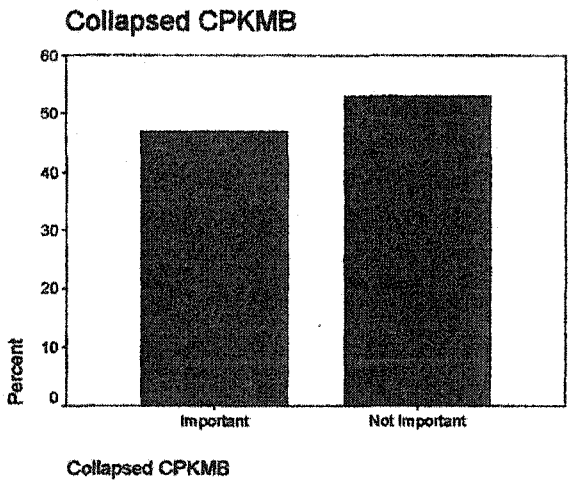
The second hypothesis was: Female physicians will more often select tests for diagnosing heart than will male physicians in both male and female patients.

CPK-MB and Troponin I are two tests physicians use when they are looking for heart. These tests were included specifically to measure whether or not physicians were attending to heart symptoms. A crosstabulation with sex of physician as the independent variable and CPK-MB as the dependent variable layered by sex of patient was ran. The same statistical test with Troponin I was performed. However, because CPK-MB and Troponin I had eight categories, there were cells with insufficient counts (fewer than five). Therefore, each variable was collapsed

into two categories: categories 1-4 were recoded as Important and 5-8 as Not Important.

As Figure 13 revealed, 47% of all physicians considered the test CPK-MB important while 54.0% of all physicians did not see the test as important. Again, this is considerable evidence that physicians were interpreting the symptoms of heart in their patients.

Figure 13.



N=270
Missing N=49

Data analysis included a crosstabulation with Physician's Sex by CPK-MB Collapsed and layered by Sex of Patient. As *Table 2* revealed, 36.5% of female physicians considered CPK-MB important to run in their female patients and considered it important 23.0% of the time in male patients. In comparison, 30.1% of female physicians considered CPK-MB less important to order in female patients and 34.0% in male patients, respectively. Among male physicians, 63.5%

considered CPK-MB an important test to run in female patients compared to 69.9% who did not. Among male patients, 77.0% of male physicians considered it important to order compared to 66.0% who did not. When the physician is female and the patient is female the expected count for Important was 16.9 and the actual count was 19, leaving a residual of 2.1. Female physicians then, over order the CPK-MB heart test. When the patient was male, female physicians under order the CPK-MB. The expected count for Important was 17.1 and the actual count was 14 leaving a residual of -3.1. When the physician was male and the patient was female, the expected count for Important was 35.1 and the actual count was 33 leaving a residual of -2.1. Male physicians, then, under-order CPK-MB for female patients. For male patients, however, they over-ordered. The expected count was 43.9 and the actual count was 47 leaving a residual of 3.1. The Pearson chi-square for male patients was 1.703 with 1 degree of freedom and was not statistically significant at $P < .05$. The Pearson chi-square for female patients was .599 with 1 degree of freedom and was not statistically significant. Therefore, this study found no support for the hypothesis that female physicians ordered tests for heart on female and male patients at higher rates than male physicians.

Table 2. Sex of Physician by Collapsed CPK-MB Layered by Sex of Patient

Sex of Physician * Collapsed CPKMB * Sex of Case Study Crosstabulation

Sex of Case Stud				Collapsed CPKMB		
				Important	Not Important	Total
Male	Sex of Physiciar	Male	Count	47	35	82
			Expected Count	43.9	38.1	82.0
			% within Collapsed CPKM	77.0%	66.0%	71.9%
			Residual	3.1	-3.1	
		Female	Count	14	18	32
			Expected Count	17.1	14.9	32.0
			% within Collapsed CPKM	23.0%	34.0%	28.1%
			Residual	-3.1	3.1	
	Total		Count	61	53	114
			Expected Count	61.0	53.0	114.0
			% within Collapsed CPKM	100.0%	100.0%	100.0%
Female	Sex of Physiciar	Male	Count	33	58	91
			Expected Count	35.1	55.9	91.0
			% within Collapsed CPKM	63.5%	69.9%	67.4%
			Residual	-2.1	2.1	
		Female	Count	19	25	44
			Expected Count	16.9	27.1	44.0
			% within Collapsed CPKM	36.5%	30.1%	32.6%
			Residual	2.1	-2.1	
	Total		Count	52	83	135
			Expected Count	52.0	83.0	135.0
			% within Collapsed CPKM	100.0%	100.0%	100.0%

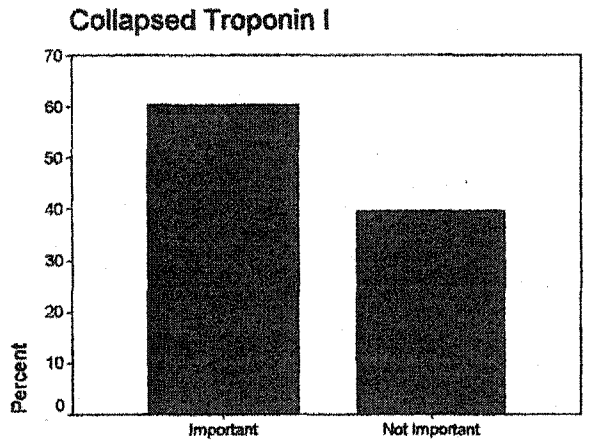
N = 249
Missing N=70

Table 2. (Continued)

Sex	Pearson Chi-square	Significance level	
		(2-sided)	(1-sided)
Males	1.703	.215	.137
Females	.599	.456	.278

Troponin I was also included as a test indicating that the physician was looking at patient's symptoms as coronary heart symptoms. As Figure 14 revealed, 60.0% of physicians considered Troponin I an Important test to run while 40.0% saw it as Not Important to order. Overall then, the majority of physicians were again looking at their patient's symptoms as possible heart symptoms.

Figure 14.



In Figure 14, a crosstabulation on Physician Sex by Troponin I recoded and layered by Sex of Patient revealed no statistically significant relationship between Physician's Sex and ordering Troponin I.

Results from *Table 3* showed 34.5% of female physicians ordered Troponon I in their female patients and 31.6% of them ordered it in their male patients. In comparison,

31.7% of female physicians did not consider Troponin I important to run in their female patients and was considerably less important to order, 24.4%, in male patients. Among male physicians, 65.5% of them considered Troponin I an important test to run in female patients compared to 68.3% whom did not consider the test important to order. In male patients, 68.4% of male physicians considered it important to order compared to 75.6% whom did not consider the test important to run. When the physician was female and the patient was female, the expected count for Important was 28.0 and the actual count was 29 leaving a residual of 1.0. Thus, there was a tendency to over-order Troponin I for female patients. When the patient was male, female physicians once again over-ordered. The expected count was 22.0 and the actual count was 24 leaving a residual of 2.0. Therefore, female physicians over-order Troponin I for both female and male patients. When the physician was male and the patient was female, the expected count for Important was 56.0 and the actual count was 55 leaving a residual of -1.0. When the physician was male and the patient was male, the expected count was 54.0 and the actual count was 52 leaving a residual of -2.0. Male physicians, then, under-order Troponin I for both male and female patients. Although not statistically significant,

Table 3. Sex of Physician by Collapsed Troponin I Layered by Sex of Patient

Sex of Physician * Collapsed Troprec * Sex of Case Study Crosstabulation

Sex of Case Stud				Collapsed Troprec: Important	Collapsed Troprec: Not Important	Total
Male	Sex of Physiciar	Male	Count	52	34	86
			Expected Count	54.0	32.0	86.0
			% within Collapsed Tropre	68.4%	75.6%	71.1%
			Residual	-2.0	2.0	
		Female	Count	24	11	35
			Expected Count	22.0	13.0	35.0
			% within Collapsed Tropre	31.6%	24.4%	28.9%
			Residual	2.0	-2.0	
	Total		Count	76	45	121
			Expected Count	76.0	45.0	121.0
			% within Collapsed Tropre	100.0%	100.0%	100.0%
Female	Sex of Physiciar	Male	Count	55	43	98
			Expected Count	56.0	42.0	98.0
			% within Collapsed Tropre	65.5%	68.3%	66.7%
			Residual	-1.0	1.0	
		Female	Count	29	20	49
			Expected Count	28.0	21.0	49.0
			% within Collapsed Tropre	34.5%	31.7%	33.3%
			Residual	1.0	-1.0	
	Total		Count	84	63	147
			Expected Count	84.0	63.0	147.0
			% within Collapsed Tropre	100.0%	100.0%	100.0%

N=268
Missing N=51

Table 3. (Continued)

Sex	Pearson Chi-square	Significance level (2-sided)	Significance level (1-sided)
Males	.700	.534	.266
Females	.125	.860	.431

as hypothesized, female physicians do show a greater tendency to order the Troponin I heart test for both male and female patients while male physicians under-order for both male and female patients.

Hypothesis Three

The third hypothesis was: Osteopathic physicians will diagnose female and male heart at higher rates than allopathic physicians.

I ran a crosstabulation with physician's sex as the independent variable and differential diagnosis of Anginal Equivalent collapsed into suspicious and not suspicious and layered by sex of patient. Results revealed a statistically significant relationship between Physician's Type of Medical Degree and Differential Diagnosis Anginal Equivalent.

As *Table 4* revealed, 44.1% of DOs were suspicious of a diagnosis of coronary heart disease in female patients compared to 55.9% who were not. In male patients, 52.8% of DOs were suspicious of CHD compared to 47.2% who were not. In comparison, 40.6% of MDs were suspicious of CHD in female patients compared to 59.4% who were not. Among male patients, 35.2% considered CHD diagnosis compared to 64.8% who did not. When the physician was a DO and the patient

was female the expected count was 14.1 and the actual count was 15 leaving a residual of 0.9. When the physician was a DO and the sex of the patient was male, the expected count was 14.5 and the actual count was 19 leaving a residual of 4.5. As hypothesized then, DOs over-diagnosed both female and male patients for heart. When the physician is a MD and the patient is female, the expected count was 43.9 and the actual count was 43 leaving a residual of -0.9. When the physician was MD and the patient was male, the expected count was 36.5 and the actual count was 32 leaving a residual of -4.5. Again, then, as hypothesized, MDs under-diagnose males and female patients for heart. This relationship is statistically significant for male patients. The Pearson chi-square value of 3.330 with 1 degree of freedom was statistically significant at the P value of <. 05 level. For female patients, the Pearson chi-square was .134 with 1 degree of freedom and was not statistically significant at the P value of < .05.

Table 4. Physician's Type of Medical License by differential diagnosis Anginal Equivalent Recoded and Layered by Sex of Patient

Prof Med License * Angina Equivalent Recoded * Sex of Case Study Crosstabulation

Sex of Case Study				Angina Equivalent Recoded: Suspicious	Angina Equivalent Recoded: Not Suspicious	Total
Male	Prof Med License	MD	Count	32	59	91
			Expected Count	36.5	54.5	91.0
			% within Prof Med License	35.2%	64.8%	100.0%
			Residual	-4.5	4.5	
		DO	Count	19	17	36
			Expected Count	14.5	21.5	36.0
			% within Prof Med License	52.8%	47.2%	100.0%
			Residual	4.5	-4.5	
	Total		Count	51	76	127
			Expected Count	51.0	76.0	127.0
			% within Prof Med License	40.2%	59.8%	100.0%
Female	Prof Med License	MD	Count	43	63	106
			Expected Count	43.9	62.1	106.0
			% within Prof Med License	40.6%	59.4%	100.0%
			Residual	-.9	.9	
		DO	Count	15	19	34
			Expected Count	14.1	19.9	34.0
			% within Prof Med License	44.1%	55.9%	100.0%
			Residual	.9	-.9	
	Total		Count	58	82	140
			Expected Count	58.0	82.0	140.0
			% within Prof Med License	41.4%	58.6%	100.0%

N=267
Missing N=22

Table 4. (Continued)

Sex	Pearson Chi-square	Significance level (2-sided)	Significance level (1-sided)
Males	3.330	.075	.053
Females	.134	.842	.432

Hypothesis Four

I hypothesized that osteopathic doctors would select tests for diagnosing heart in female and male patients at higher rates than their allopathic counterparts.

Two separate tests were run to test this hypothesis. First, Physician's Type of Medical Degree by Troponin I layered by Sex of Patient was run. Second, Physician's Type of Medical Degree by CPK-MB layered by Sex of Patient was run.

Table 5 revealed 28.9% of all DOs considered Troponin I important to order in their female patients compared to 18.0% who did not. In male patients, 24.4% of DOs considered Troponin I important to order compared to 34.1% who did not. Among MDs, 71.1% considered Troponin I important to order in female patients compared to 82.0% who did not. In male patients, 75.6% of MDs would order Troponin I compared to 65.9% who considered the test less important to order.

For DOs with female patients, the expected count for Important was 20.2 and the actual count was 24 leaving a residual of 3.8. DOs then, tend to over-order Troponin I for female patients. For male patients, the expected count for Important was 21.7 and the actual count was 19 leaving a residual of -2.7. For male patients, then, DOs tend to

Table 5. Physician Type of Degree and test ordered Recoded Troponin I Layered by Sex of Patient

Prof Med License * Collapsed Troponin I * Sex of Case Study Crosstabulation

Sex of Case Stud				Collapsed Troponin I: Important	Collapsed Troponin I: Not Important	Total
Male	Prof Med License	MD	Count	59	29	88
			Expected Count	56.3	31.7	88.0
			% within Collapsed Troponin I	75.6%	65.9%	72.1%
			Residual	2.7	-2.7	
		DO	Count	19	15	34
			Expected Count	21.7	12.3	34.0
			% within Collapsed Troponin I	24.4%	34.1%	27.9%
			Residual	-2.7	2.7	
	Total		Count	78	44	122
			Expected Count	78.0	44.0	122.0
			% within Collapsed Troponin I	100.0%	100.0%	100.0%
Female	Prof Med License	MD	Count	59	50	109
			Expected Count	62.8	46.2	109.0
			% within Collapsed Troponin I	71.1%	82.0%	75.7%
			Residual	-3.8	3.8	
		DO	Count	24	11	35
			Expected Count	20.2	14.8	35.0
			% within Collapsed Troponin I	28.9%	18.0%	24.3%
			Residual	3.8	-3.8	
	Total		Count	83	61	144
			Expected Count	83.0	61.0	144.0
			% within Collapsed Troponin I	100.0%	100.0%	100.0%

N=266
Missing N=23

Table 5. (Continued)

Sex	Pearson Chi-square	Significance level (2-sided)	Significance level (1-sided)
Males	1.325	.295	.173
Females	2.263	.169	.095

under-order Troponin I. On the other hand, MDs with female patients tend to under-order Troponin I. The expected count for Importance was 62.8 and the actual count was 59 leaving a residual of -3.8. For male patients, the expected count was 56.3 and the actual count was 59 leaving a residual of 2.7. MDs then tend to under-order for their female patients and over-order for their male patients. The Pearson chi-square value of 1.325 for male patients with 1 degree of freedom was not statistically significant. The Pearson chi-square value for females was 2.263 with 1 degree of freedom was not statistically significant. My hypothesis that DOs would order tests for heart at higher rates than MDs in both male and female patients was not supported.

As *Table 6* revealed 31.4% of DOs considered CPK-MB important to order in female patients compared to 16.0% who did not. In male patients, 19.0% of DOs considered it important to order compared to 39.6% who did not. Among MD physicians, 68.6% considered CPK-MB important to order in female patients compared to 84.0% who did not. In male patient, 81.0% of MDs considered it important to order compared to 60.4% who did not. For osteopathic physicians with female patients, the expected count for Imporant was 11.2 and the actual count was 16 leaving a residual of 4.8.

Table 6. Physician Type of Medical Degree by test ordered Recoded CPK-MB Layered by Sex of Patient

Prof Med License * Collapsed CPKMB * Sex of Case Study Crosstabulation

Sex of Case Study				Collapsed CPKMB: Important	Collapsed CPKMB: Not Important	Total
Male	Prof Med License	MD	Count	51	32	83
			Expected Count	45.1	37.9	83.0
			% within Collapsed CPKMB	81.0%	60.4%	71.6%
			Residual	5.9	-5.9	
		DO	Count	12	21	33
			Expected Count	17.9	15.1	33.0
			% within Collapsed CPKMB	19.0%	39.6%	28.4%
			Residual	-5.9	5.9	
	Total		Count	63	53	116
			Expected Count	63.0	53.0	116.0
			% within Collapsed CPKMB	100.0%	100.0%	100.0%
Female	Prof Med License	MD	Count	35	68	103
			Expected Count	39.8	63.2	103.0
			% within Collapsed CPKMB	68.6%	84.0%	78.0%
			Residual	-4.8	4.8	
		DO	Count	16	13	29
			Expected Count	11.2	17.8	29.0
			% within Collapsed CPKMB	31.4%	16.0%	22.0%
			Residual	4.8	-4.8	
	Total		Count	51	81	132
			Expected Count	51.0	81.0	132.0
			% within Collapsed CPKMB	100.0%	100.0%	100.0%

N=248
Missing N=41

Table 6. (Continued)

Sex	Pearson Chi-square	Significance level (2-sided)	Significance level (1-sided)
Males	5.986	.022	.012
Females	4.286	.038	.033

DOs then, over-order CPK-MB for their female patients. For male patients, DOs under-order. The expected count for Important was 17.9 and the actual count was 12 leaving a residual of -5.9. Allopathic physicians, on the other hand, under-order CPK-MB for female patients. The expected count for Important was 39.8 and the actual count was 35 leaving a residual of -4.8. With male patients, however, MDs significantly over-order CPK. The expected count for Important was 45.1 and the actual count was 51 leaving a residual of 5.9. The Pearson chi-square value for male patients was 5.986 with 1 degree of freedom and was statistically significant at the $P < .05$. The Pearson chi-square for female patients was 4.286 with 1 degree of freedom and was statistically significant at the $P < .05$ level.

Hypothesis Five

I hypothesized that more recently graduated physicians would diagnose female and male heart at higher rates than less recently graduated doctors.

The literature on female heart reports that since 1990 considerable feminist research has been conducted and that medical schools began introducing that knowledge into the medical school curriculum. It is reasonable to

hypothesize, then, that doctors who would have been in medical school during the period when this new knowledge was integrated into the curriculum would be more likely to recognize symptoms in female heart.

A crosstabulation was run to examine the influence of the year graduated on selection of tests. In order to see if physicians who were in medical school over the past twenty years have been differently educated than those prior to 1995, I collapsed year graduated into two categories: 1995-2004 representing years during integration of the female model, and 1994 and earlier, representing years before integration of the female model into the medical curriculum.

As *Table 7* revealed, 14.7% of physicians who graduated within the last 10 years were suspicious of CHD in their female patients compared to 16.7% in this same graduate cohort who were not suspicious of CHD. In male patients, 18.7% of those recent graduated physicians responded suspiciously to CHD compared to 11.1% who did not. In physicians prior to exposure to the female model, 85.3% were suspicious of CHD in female patients compared to 83.3% who were not. In male patients, 81.3% of those physicians who graduated prior to exposure to female model were suspicious of CHD compared to 88.9% who were not.

Table 7. Collapsed Year Graduated 10 by differential diagnosis Collapsed Anginal Equivalent Layered by Sex of Patient

Collapsed Year Graduated 10 * Collapsed Anginal Equivalent * Sex of Case Study Crosstabulation

Sex of Case Stu				Collapsed Anginal Equivalent		Total
				suspicious	not suspicious	
Male	Collapsed Yea	Femmodel	Count	20	2	22
	Graduated 10		Expected Count	18.8	3.2	22.0
			% within Collapse Anginal Equivaler	18.7%	11.1%	17.6%
			Residual	1.2	-1.2	
		Before femmod	Count	87	16	103
			Expected Count	88.2	14.8	103.0
			% within Collapse Anginal Equivaler	81.3%	88.9%	82.4%
			Residual	-1.2	1.2	
	Total		Count	107	18	125
			Expected Count	107.0	18.0	125.0
			% within Collapse Anginal Equivaler	100.0%	100.0%	100.0%
Female	Collapsed Yea	Femmodel	Count	17	4	21
	Graduated 10		Expected Count	17.4	3.6	21.0
			% within Collapse Anginal Equivaler	14.7%	16.7%	15.0%
			Residual	-.4	.4	
		Before femmod	Count	99	20	119
			Expected Count	98.6	20.4	119.0
			% within Collapse Anginal Equivaler	85.3%	83.3%	85.0%
			Residual	.4	-.4	
	Total		Count	116	24	140
			Expected Count	116.0	24.0	140.0
			% within Collapse Anginal Equivaler	100.0%	100.0%	100.0%

N=265
Missing N=24

Table 7. (Continued)

Sex	Pearson Chi-square	Significance level	
		(2-sided)	(1-sided)
Males	.611	.738	.345
Females	.063	.759	.505

When diagnosing female patients, physicians graduated in the last 10 years and who were in medical school during a period of exposure to a female model of heart had an expected count on Suspicious of 17.4 and actual count of 17 leaving a residual of -.4. For male patients, they had an expected count of 18.8 and an actual count of 20 with a residual of 1.2. For physicians graduated prior to the introduction of the female model, the expected count was 98.6 and the actual count was 99 leaving a residual of .4. For male patients, the expected count was 88.2 and the actual count was 87 leaving a residual of -1.2. None of these crosstabulations were statistically significant. Therefore, I cannot reject the null hypothesis of no relationship between year graduated and diagnosis of heart in female and male patients.

Crosstabulation on collapsed year graduated by collapsed CPKMB into Important and Not Important and layered by Sex of Patient revealed no significant relationship. The Pearson chi-square value for males was .013 with 1 degree of freedom and was not statistically significant at the P value of <. 05 level. The Pearson chi-square for females was 1.330 with 1 degree of freedom and was not statistically significant at P value of < .05.

I also ran the same crosstabulation with test ordered Troponin I collapsed into two categories considered important and not considered important. Again, there was no statistically significant relationship. The Pearson chi-square value for males was .248 with 1 degree of freedom and was not statistically significant at the P value of < .05. The Pearson chi-square value for females was .263 with 1 degree of freedom and was not statistically significant at the P value of < .05. Therefore, it was concluded that being in graduate school in the last 10 years in comparison with previous graduate education has no effect on tests ordered for suspicion of heart. The hypothesis that more recently graduated doctors would select tests for female heart was not supported.

Collapsed year graduated and test ordered CPKMB collapsed and layered by physician's medical degree was performed because I was interested in knowing if the medical school experience over the past twenty years has been different for MDs in comparison with DOs. However, there was no statistically significant relationship.

Hypothesis Six

I hypothesized that all physicians would diagnose male patients at higher rates than female patients.

Table 8. Sex of Patient by recoded differential diagnosis Anginal Equivalent

Sex of Case Study * Angina Equivalent Recoded Crosstabulation

			Angina Equivalent Recoded		
			Suspicious	Not Suspicious	Total
Sex of Case Study	Male	Count	53	82	135
		Expected Coun	54.4	80.6	135.0
		% within Sex of Case Study	39.3%	60.7%	100.0%
		Residual	-1.4	1.4	
	Female	Count	63	90	153
		Expected Coun	61.6	91.4	153.0
		% within Sex of Case Study	41.2%	58.8%	100.0%
		Residual	1.4	-1.4	
Total		Count	116	172	288
		Expected Coun	116.0	172.0	288.0
		% within Sex of Case Study	40.3%	59.7%	100.0%

N= 288
Missing N=31

Table 8. (Continued)

Pearson Chi-square	Significance level	
	(2-sided)	(1-sided)
.110	.810	.417

As *Table 8* revealed, the crosstabulation revealed no statistically significant relationship between sex of patient and differential diagnosis for heart. The Pearson chi-square value was .110 with 1 degree of freedom was not statistically significant at the $P < .05$ level. Coronary heart disease was considered suspicious in 39.3% of the male patients compared to 60.7% who were not. In female patients, 41.2% of physicians were suspicious of CHD compared to 58.8% who were not. For male patients, the expected count for Suspicion of heart was 54.4 and the actual count was 53 with a residual of -1.4. For female patients, the expected count for Suspicion of heart was 61.6 and the actual count was 63 with a residual of 1.4 indicating no relationship exists between sex of the patient and tests ordered for suspicion of heart in both male and female patients. Therefore I cannot reject the null hypothesis of no relationship.

Part Three: Discussion

The number of females who responded to the survey is higher than the national average. Nationally, the percent of all physicians who are female is 23% while this sample included 30% female physicians. This is much higher than expected given that females tend not to practice in rural

areas. This could be attributed to several reasons. First, the sample targeted general practice and internal medicine, two of the specializations with large percentages of practicing female physicians. In addition, the higher number of female physicians could be attributed to the fact that females make up a higher percentage of DOs (27.2) than of MDs (25.2%) (AOA Factsheet, 2004; AMA Factsheet, 2004).

The sample of physician respondents in this survey included 70.6% MDs and 24.8% DOs. Again, this is a higher than national average. Nationally, DOs constitute only 5.5% of all physicians. This difference could be due to several factors. First, Michigan has one of the largest populations of DOs in the nation. Michigan is second only to Pennsylvania in percentage of all physicians who are osteopaths, 9.8% and 10.3% respectively. More importantly, the Michigan State University College of Osteopathic Medicine offers special incentives and programs to draw osteopathic physicians into the rural counties of Michigan. Thus, while the total population of northern Michigan is lower than in southern Michigan, the number of DOs in northern Michigan is comparable to that in southern Michigan.[3] Finally, a significant reason for the higher

[3] See Appendix G for maps on physician demographics by state and nationally.

number of DO respondents may be due to the fact that very little research specifically targets DOs and even rarer, are studies that examine the situation of rural and female DOs. The study then may have been particularly interesting to this group.

Overall, the sample of respondents offers a representative sample of male and female, MD and DO, rural Michigan physicians. However, this sample would not be representative of the percentages of DOs practicing medicine outside of Michigan. Therefore, generalizations to rural physicians in other states should not be made.

The educational initiatives on women's heart have been ongoing since 1993. This study hypothesized that those physicians who were in medical school during those years would be educated on the women's model of heart disease. Therefore, the year physicians graduated was an important variable to examine. Eighteen percent of the physicians sampled completed graduate school within the past 10 years.

The physician's age and years of continuous medical practice were collected in order to obtain a better understanding of rural Michigan physicians as a group. The age of physicians in this sample corresponds very closely with national averages. For example, nationally 33% of

osteopaths are between 35 and 44 years old. Within this sample, about 32% are between 35 and 44 years of age.

The dependent variables in this study included differential diagnosis and test ordered. Differential diagnosis Anginal Equivalent was particularly important because this diagnosis was a marker that physicians were suspicious of heart. It is very important to note that approximately 20% of the physicians gave this diagnosis as their first diagnosis. Put differently, 80% of physicians did not select Anginal Equivalent as their first diagnosis. What this evidence demonstrates is that as many as 80% of the physicians in this study were not making diagnostic decisions based on the new model of female heart.

The other dependent variable was test ordered. CPK-MB and Troponin I were markers for diagnosing heart. It is important to note that only 8% of physicians ranked CPK-MB as Most Important and only 16.8% of physicians ranked it in the top two tests to run. In comparison, Troponin I was ranked as the first test to run by 11.9% and as one of the two Most Important test to run by 28.4%. Again, however, this indicates that the vast majority of physicians did not consider tests for heart at the top of their lists. Another consideration is laboratory fees for diagnostic tests. The literature on cardiac test markers reveal

Troponin I cost substantially less than CPK-MB and may factor into physicians ordering it at higher rates than CPK-MB (Science Daily News, 2001).

The results of the crosstabulations revealed considerable support for the following hypotheses. The hypothesis that female physicians would diagnose heart at higher rates in both male and female patients than male physicians was partially supported. Female physicians did diagnose heart in female patients at higher rates than male physicians, but they did not diagnose male patients at higher rates. Part of the rationale for hypothesizing that female physicians would diagnose male heart at higher rates was that I anticipated that physicians would use the female model of heart to raise suspicions about male symptoms as heart related. This hypothesized relationship was not supported. Highly significant, is that while male physicians diagnose male patients at higher rates they diagnose females at statistically significant lower rates. As hypothesized, male physicians are not basing their diagnoses on the female model of heart disease.

Several explanations for these findings should be considered. First, the historical connections between feminist organizations and holistic medicine should be considered. As noted earlier, women's entry into medical

schools historically meant admission into unorthodox schools that focused on holistic medicine. In addition, the second wave of feminism critiqued traditional medical practices and often turned to holism as an alternative. It is highly significant that such initiatives as the Boston Women's Health Collective took a holistic focus. Further research is needed to determine the extent to which the female medical model of coronary heart disease is being adopted and disseminated by women's organizations that promote a holistic approach. If indeed there is a connection between women physicians and holistic health initiatives then it may explain the higher rates of women physicians diagnosing women patients. Another consideration may be found in the doctor-patient interview. Martin, Arnold and Parker's (1998) study suggests women physicians show more empathy towards their patients. This finding supports what is historically known about women physicians' role during the nineteenth-century and in what Morantz-Sanchez (1999) and other historians, notably, coined the *empathetic doctor*.

Second, research strongly suggests that the medical initiatives focusing on women's heart disease are being sponsored by women's medical organizations. These organizations may be using methods and networks for

disseminating information that are more successful at reaching women physicians than they are at reaching male physicians. The publications, the educational opportunities, and the public discussions may target women physicians. This could result in women physicians being better educated and more aware of women's heart symptoms than their male counterparts. Further research into the modes of dissemination of women's heart data should be undertaken.

In addition, medical school curriculums should also be considered. Research has suggested that the female model of heart is now being introduced into medical school curriculums. However, no information was available on how this information is being integrated into the standard curriculum. For example, if courses specifically designed to target women's heart disease are offered as optional or additional courses to the standard curriculum, it may be that women more often enroll in such courses. This is the pattern in women's studies courses in general. Thus, again, women would be exposed to this knowledge at greater rates than men. Studies are needed to determine how this knowledge is being integrated into the standard curriculum.

Finally, attention should be given to the modes of reporting medical information by the mainstream medical

journals such as *The Journal of the American Medical Association*, *The New England Journal of Medicine*, and *The Journal of Osteopathic Medicine*. A content analysis of these journals could reveal their attention to female issues in comparison with male issues.

It was hypothesized that osteopathic physicians would diagnose female and male heart at higher rates than allopathic physicians. This hypothesis was supported for male patients. As hypothesized, DOs diagnosed both female and male patients for heart at higher rates. MDs, however, diagnosed both male and female patients for heart at lower rates. DOs, then, diagnose their female patients at their expected counts, but diagnosed male patients at higher rates. MDs, on the other hand, diagnose females at the expected count, but under-diagnose their male patients. In short then, MDs did not rank the symptoms as heart related when the patient was male, but did rank them as heart related when the patient was female. DOs ranked the symptoms as heart related in both female and male patients. Although not statistically significant for female patients, this relationship was statistically significant for male patients.

Whether a physician is an MD or a DO, the rates of diagnosing female heart are no higher than statistically

expected. Type of medical degree, in other words, has no effect on diagnosing women. It should be noted, however, that the review of literature summarized numerous studies that found that women were under diagnosed for heart symptoms. While MDs did tend to under diagnose heart disease in female patient, DOs did not under diagnose. Indeed, DOs over diagnosed although at levels not statistically significant. This in itself is a highly important finding.

Type of medical degree, however, did have an effect on the diagnostic outcomes of male patients. MDs did not look at these symptoms as heart related in male patients. DOs however did. These findings suggest two important explanations. First, that MDs significantly under diagnosed male patients suggests that they were following the male model of heart disease and did not consider these symptoms as connected to heart. MDs then, showed a narrowness in their interpretive approach. The holistic approach taken by DOs may have a positive effect on diagnostic outcomes in both male and female patients. Because holism requires attention to the whole body, it promotes attention to a wider array of symptoms. Further and equally important, a holistic approach may incline physicians to pay attention to studies that suggest

multisystem symptomologies. In other words, holistically inclined physicians may be more apt to engage in continuing education in studies that look at alternative symptomologies and at the way multiple bodily systems are interconnected. These are the very characteristics of the female model of heart disease. Holism may signal more than a type of medical approach; it may also signal different interests in continuing education. In addition, holistically inclined physicians may be more apt to subscribe to journals and enroll in organizations that focus on research emphasizes integrated bodily systems.

It was hypothesized those osteopathic physicians would select tests for diagnosing heart in female and male patients at higher rates than allopathic physicians. Looking at Troponin I, there was no statistically significant relationship. However, for CPK-MB, there was a statistically significant relationship between physician type of degree and ordering CPK-MB for both male and female patients. As hypothesized, DOs ordered CPK-MB for their female patients in higher numbers. DOs ordered CPK-MB for male patients at much lower levels. Allopaths, ordered CPK-MB at high levels for male patients. This was an unexpected finding. As hypothesized, they ordered CPK-MB for female patients at lower levels. DOs, however, make

selections for tests for females that are consistent with the female model of heart disease.

It was hypothesized that more recently graduated physicians (those graduated in the past 10 years) would diagnose female and male heart at higher rates than less recently graduated physicians. There was no support for this hypothesis. One of the considerations from this finding is that efforts to educate physicians after graduation have been successful. In other words, continuing education programs and awareness campaigns such as televised information ads, may have educated physicians and patients on the new model, rendering year of graduation less important. Another important consideration is the 10 year time span from graduation may not be a long enough time, as of yet, to measure an overall effect on coronary heart rates in both female and male patients. History has shown that significant cultural changes take time and can lag for years before it is noticed.

Overall, this research has supported the hypothesized relationship among female physicians, osteopaths and heart disease. The evidence suggests that female physicians and osteopaths are diagnosing women for heart disease at higher rates than male physicians and allopaths. In addition, female physicians and osteopaths are ordering tests for

heart on women at higher rates than male physicians and allopaths.

CHAPTER SEVEN:
CONCLUSIONS

Summary of Findings

Research now offers some well-established criteria for understanding the symptomology specific to female heart disease. Women's health initiatives have engaged in the important process of demanding funding for new research specifically on women's heart, for the inclusion of women in existing studies on heart, and in disseminating information about research findings. What this research has shown is that female physicians are diagnosing and ordering tests on their female patients in ways that suggest the new model is a part of the knowledge technology they draw on. Male physicians, however, have not demonstrated in this research a similar pattern of drawing on the female model. Thus, the feminist initiatives in developing models of female heart disease are affecting and changing the practices of female physicians, insofar as the diagnostic patterns seen in this research is evidence of that.

Given that more than 75% of physicians are male, the reasons for male physicians lagging in the use of this

technology needs to be brought into policy focus. One consideration might surely be resistance to feminist activism on female heart disease. The other may be that the standard, male models of heart disease are being defended as adequate and legitimate insofar as the male model is based on clinical research evidence. Finally, the modes of teaching physicians that have been used to disseminate information about heart may be more effective in reaching female physicians than male physicians. For example, research suggests that feminist medical organizations have played a primary role in disseminating information and educating women physicians.

This study has policy implications for medical school curriculums. It strongly suggests that medical schools incorporate the female model of heart into its mainstream curriculum. It further suggests that the holistic approach to medicine may be highly effective for heart outcomes in both male and female patients. In addition, the study also has policy implications for the clinical training of physicians. All physicians should be trained to recognize the symptoms of female heart disease included in the female model.

Medical schools must be diligent in their efforts to incorporate women's health aspects into their core

curriculums. They must ensure that every student is exposed to this knowledge. This study shows evidence that female physicians are receiving and adopting the female model. However, male physicians must also be socialized to this model.

This research has also suggested that DOs diagnose and order tests consistent with the female model. This study suggests that the osteopathic model of holistic medicine encourages physicians to consider a wider variety of symptoms, technologies and approaches to care. In comparison with allopaths, they are far more open and progressive in their practice styles. In other words, I believe that DOs have been more receptive to the new knowledge technology now available on women's heart disease.

In terms of treating rural women's heart, the over-representation of DOs in rural areas may benefit rural women. However, only studies that can make comparisons with urban DOs would be able to test this assumption further. Rural physicians lack extensive technology and other resources and rural populations are often poor. These two factors make the study of new technology in rural areas particularly important. Insofar as rural physicians and hospitals have limited resources for procuring new

equipment for diagnosis and treatment, it is crucial that they include the specifications for women's heart disease in their decisions about what equipment and other technology to procure. Otherwise, new equipment will not necessarily translate into better treatment for women. For patients with limited resources, the selection of a limited number of tests and treatment options necessitates that those tests and treatment options be chosen with the specific characteristics of women's heart disease in mind.

Limitations of the Study

There are some limitations to this study that should be addressed in future research. First, research now documents that African American women, Mexican American women, and Caucasian women have differing rates of heart disease, differing risk factors and complicating disease processes. Race, then, should be included in research. Evidence as to whether the female model of heart is appropriate to the symptomologies of racial and ethnic subgroups is needed.

In addition, a very important aspect for future study is to ascertain information about professional journals, professional organizations and other modes of disseminating information. I believe this is especially important for

understanding how new technologies are incorporated into practice. Related to this, information on continuing education among physicians is needed. Research is needed on how physicians maintain their knowledge and keep abreast of current literature through continuing education.

Finally, it is significant to reiterate the importance of understanding this research within the framework of social processes of knowledge distribution. The focus of this study has been on the historical and contemporary situation of physicians. It has also focused on the characteristics of the organizations and associations in which they practice medicine. These are the parameters for understanding the findings in this research and should be the parameters for designing future study as well.

APPENDICES

Apendix A

Approval Letter from the HSIRB

Date: April 7, 2003

To: Timothy Diamond, Principal Investigator
Victoria Curtis, Student Investigator for dissertation

From: Mary Lagerwey, Chair Mary Lagerwey

Re: HSIRB Project Number: 03-02-30

This letter will serve as confirmation that your research project entitled "Women and Heart Disease: A Comparative Analysis of Osteopathic versus Allopathic Rural Physicians' Medical Approaches to Diagnosing Female Coronary Artery Disease" has been **approved** under the **expedited** category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note that you may **only** conduct this research exactly in the form it was approved. You must seek specific board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: April 7, 2004

Apendix B

Approval Letter from HSIRB of change of dissertation advisor

Date: January 21, 2004

To: Victoria Ross, Principal Investigator
Victoria Curtis, Student Investigator for dissertation

From: Mary Lagerwey, Chair Mary Lagerwey

Re: HSIRB Project Number: 03-02-30

This letter will serve as confirmation that the changes to your research project "Women and Heart Disease: A Comparative Analysis of Osteopathic versus Allopathic Rural Physicians' Medical Approaches to Diagnosing Female Coronary Artery Disease" requested in your email messages dated 1/19/04 (change of PI) and 1/21/04 (second mailing of your survey) have been approved by the Human Subjects Institutional Review Board.

The conditions and the duration of this approval are specified in the Policies of Western Michigan University.

Please note that you may only conduct this research exactly in the form it was approved. You must seek specific board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: April 7, 2004

Walwood Hall, 5456
PHONE: (269) 387 8276

RECEIVED

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Approval Le Apendix C

.R.R.

Approval Letter from HSIRB to extend dissertation study - 2 pages

I. PROJECT INFORMATION

PROJECT TITLE: Women and Heart Ds: A Comparative Analysis Between Osteopathic Rural Michigan Physicians' Medical Approaches Taken to Diagnosing Women's

HSIRB Project Number: 03-02-30

Previous level of review: ☐ Full Board Review ☑ Expedited Review ☐ Administrative (Exempt) Rev

Date of Review Request: 2/26/04 Date of Last Approval: 4/7/03; 1/22/04

II. INVESTIGATOR INFORMATION

PRINCIPAL INVESTIGATOR OR ADVISOR

Name: Victoria Ross

Department: Soc Mail Stop: Electronic Mail Address: victoria.ross@w

(1) CO-PRINCIPAL OR STUDENT INVESTIGATOR

Name: Victoria S. Curtis

Department: Soc Mail Stop: Electronic Mail Address: victoria.curtis@

(2) CO-PRINCIPAL OR STUDENT INVESTIGATOR

Name:

Department: Mail Stop: Electronic Mail Address:

III. CURRENT STATUS OF RESEARCH PROJECT

Please answer questions 1-4 to determine if this project requires continuing review by the HSIRB.

1. The project is closed to recruitment of new subjects.
   ☐ Yes (Date of last enrollment: 3/04) end of first week of March ☐ No (Project must be reviewed for renewal.)
2. All subjects have completed research related interventions.
   ☑ Yes ☐ Not Applicable ☐ No (Project must be reviewed for renewal.)
3. Long-term follow-up of subjects has been completed.
   ☐ Yes ☑ Not Applicable ☐ No (Project must be reviewed for renewal.)
4. Analysis of data is complete.
   ☐ Yes ☑ No (Project must be reviewed for renewal.)

- If you have answered "No" to ANY of the questions above, you must apply for Continuing Review. Please complete numbers 5-12 on page 2. If you need to make changes in your protocol, please submit a separate memo detailing the changes that you are requesting.
- If you have answered "Yes" or "Not Applicable" to ALL of the above questions, the project may be closed.
- If your protocol has been open for three years and you still want to collect or analyze data, you must close this protocol by filing a final report using this form and apply for approval of a new protocol using an Application for Initial Review. Please make a Final Report on your project by completing numbers 5-9 on page 2.

IV. ☑ Application for Continuing Review V. ☐ Final Report

HSIRB Project Number: Apendix C continued

5. Have there been changes in Principal or Co-Principal Investigators? ☐Yes ☑No
   (If yes, provide details on an "Additional Investigators" form (available at the HSIRB web site, http://www.wmich.edu/research/compliance/hsirb/hsirb_2.html).)

6. Has the approved protocol been modified or added to with respect to:
   (If yes to any item below, provide the details on an attached sheet.)
   a. Procedures ☐Yes ☑No
   b. Subjects ☐Yes ☑No
   c. Design ☐Yes ☑No
   d. Data collection ☐Yes ☑No

7. Has any instrumentation been modified or added to the protocol? ☐Yes ☑No
   (If yes, attach new instrumentation or indicate the modifications made.)

8. Have there been any adverse events that need to be reported to the HSIRB? ☐Yes
   ☑No
   (If yes, provide details on an attached sheet.)

9. Total number of subjects approved in original protocol: 250

10. Total number of subjects enrolled so far: 700
    If applicable: Number of subjects in experimental group: Number in control group:

- If this is a FINAL REPORT you may stop here and return the form electronically.
- If this is an APPLICATION FOR CONTINUING REVIEW continue with numbers 10-12 below.

11. Estimated number of subjects yet to be enrolled: 0

12. **Verification of Consent Procedure:** Provide copies of the consent documents signed by the last two subjects enrolled in the project. Cover the signature in such a way that the name is not clear but there is evidence of signature. If subjects are not required to sign the consent document, provide a copy of the most current consent document being used.

13. **If you are continuing to recruit subjects for this project, please remember to include a clean original of the consent documents to receive a renewed approval stamp.**

J.R. 2-26-04
Principal Investigator/Faculty Advisor Signature Date

Kelly Schuch 2/26/04
Co-Principal or Student Investigator Signature Date

Approved by the HSIRB:

Mary Zagzebski 3-23-04
HSIRB Chair Signature Date

Western Michigan University
Human Subject Institutional Review Board – Mail Stop 5456

Revised 7/03 WMU HSIRB
All other copies obsolete.

College of Arts and Sciences
Department of Sociology

Kalamazoo, Michigan 49008-5257
616 387-5270
FAX: 616 387-2882

WESTERN MICHIGAN UNIVERSITY

ICHIGAN UNIVERSITY
I. R. B.
r one year from this date:
R 0 7 2003

Appendix D

Rural Health Survey Consent and Survey Instrument

Rural Health Study
Survey Consent Form

x Main Tavarez
HSIRB Chair

You are being asked to participate in a rural health study regarding aspects of clinical decision-making. I am particularly interested in finding out more about how patients are medically managed by rural physicians. Your participation in this study is strictly voluntary. You have the right to not answer any question presented in this survey questionnaire. In addition you have the option to stop participating in this study at any time. The study is being conducted by Timothy Diamond and Victoria S. Curtis from Western Michigan University, Department of Sociology. This research is being conducted as part of the dissertation requirements for Victoria S. Curtis.

It will take you approximately five to ten minutes to complete the survey. Data collected from this survey will remain anonymous. Your responses to the survey questions will not disclose you or the medical center you are affiliated with. There are no known risks involved in participating in this study. Data obtained from this study may be published. The results from this study will be made available to all participating hospital centers. If you have any questions, you may contact Timothy Diamond at (269) 387-5282, Victoria S. Curtis at (269) 387-5294, the Human Subjects Institutional Review Board (269) 387-8293 or the vice president for research (269) 387-8298.

This consent document has been approved for use for one year by the Human Subjects Institutional Review Board as indicated by the stamped date and signature of the board chair in the upper right corner. You should not participate in this project if the stamped date is more than one year old.

Returning the survey indicates your consent for use of the answers you supply. To secure anonymity please use the self-addressed stamped envelope enclosed with the survey questionnaire. Your participation in this study is appreciated.

Please continue on next page

Please answer the following question about yourself:

1. Professional medical license:
   _____ Licensed M.D.
   _____ Licensed D.O.
   _____ Licensed Physician Assistant affiliated with a licensed M.D.
   _____ Licensed Physician Assistant affiliated with a licensed D.O.

2. Sex:
   _____ Female
   _____ Male

3. Age which best describes you:
   _____ Between 25-30 years of age
   _____ Between 31-35 years of age
   _____ Between 36-40 years of age
   _____ Between 41-45 years of age
   _____ Between 46-50 years of age
   _____ Between 51-55 years of age
   _____ Between 56-60 years of age
   _____ Between 61-65 years of age
   _____ Between 66-70 years of age
   _____ Between 71-75 years of age
   _____ Over 75 years of age

4. Please write in the year you graduated from medical school:
   _____ Year

5. Years of continuous practice since graduating from medical school:
   _____ 1-5
   _____ 6-10
   _____ 11-15
   _____ 16-20
   _____ 21-25
   _____ 26-30
   _____ 31-35
   _____ 36-40
   _____ 41-45
   _____ 46-50
   _____ >50

This section ends the demographic portion of the survey questionnaire

On the following page you will be presented with a documented case study. Please respond to the questions that immediately follow the case study.

Case Study

A 52-year-old Caucasian female presents to the hospital emergency room with right upper abdominal pain. Patient rates pain approximately at 5 based on a scale between 1 to 10 (1 designating least amount of pain and 10 designating greatest amount of pain). She reports dizziness, shortness of breath, and right epigastric pain. She is positive for nausea. No vomiting. Patient reports a positive history of smoking (1pk/day for 35 years). Menses irregular with hot flashes. No medications. Physical examination reveals a blood pressure of 160/98. Pulse of 120-sinus rhythm. Respirations at 20. Body temperature of 100 degrees Fahrenheit. Patient feels clammy to touch and looks visibly pale. Heart reveals RRR with PVC's. Lungs show rare end expiration wheezes. Abdomen reveals mild RUQ tenderness. Negative peritoneal signs. Extremities feel cool with no edema. Lab findings reveal serum Cholesterol of 210. Triglyceride of 500. WBC 13.0; Hgb 15.2; and blood Glucose of 122.

1. What is your differential diagnosis? (Please list in order of highest index of suspicion on a 1 to 7 scale).

_____ COPD	_____ Pleurisy
_____ Cholecystitis	_____ Costochondritis/Anterior Chest Wall Syndrome
_____ PUD	
_____ Angina	
_____ Pneumonia	

2. What tests would you order? (List in order of importance on a scale of 1 to 8. 1 designating most important and 8 designating least important).

_____ AAS	_____ Gallbladder Ultrasound
_____ CXR	_____ Pulse Oximeter
_____ EKG	_____ Hemocult Blood Stool
_____ CPK/CK-MB	_____ Other (Please specify: _____).
_____ Troponin I	

3. Please write in the space below what tests listed above are not available to you in-house in managing this case:

_____ _____ _____

4. Please write in the space below any additional test[s] not listed in question two you would like considered and/or accessible in-house for use in managing this case:

_____ _____ _____

Please continue on next page

Additional findings:

Further study results are obtained on this patient. Acute abdominal series show non-specific gas pattern. Chest x-ray reveals mild emphysematous changes. Normal heart size. Troponin I result is less than 0.1. EKG shows sinus tachycardia, rhythm irregular, with non-specific ST and T wave changes in the inferior leads. CPK is 215. Gallbladder ultrasound shows few echogenic shadows suggestive of Cholelithiasis. Pulse Oximeter of 94%. Hemocult Blood stool is negative.

5. Based on the additional information provided above would you admit the patient?
   _____ Yes
   _____ No

6. If you answered yes to the above question, what is your admitting diagnosis?
   _____ RUQ epigastric pain . . . r/o PUD
   _____ RUQ pain . . . r/o Cholecystitis
   _____ Right epigastric pain . . . r/o Pneumonia RLL
   _____ Atypical epigastric pain . . . r/o Anginal equivalent
   _____ RUQ epigastric pain . . . r/o Acute Chest Wall Syndrome

The End

After completion, please be sure to place the completed survey questionnaire inside the enclosed self-addressed envelope and mail. Again, thank you for your participation in this study. Your help in this project is greatly appreciated.

Case Study

A 52-year-old Caucasian male presents to the hospital emergency room with right upper abdominal pain. Patient rates pain approximately at 5 based on a scale between 1 and 10 (1 designating least amount of pain and 10 designating greatest amount of pain). He reports dizziness, shortness of breath, and right epigastric pain. He is positive for nausea. No vomiting. Patient reports a positive history of smoking (1pk/day for 35 years). No medications. Physical examination reveals a blood pressure of 160/98. Pulse of 120-sinus rhythm. Respirations at 20. Body temperature of 100 degrees Fahrenheit. Patient feels clammy to touch and looks visibly pale. Heart reveals RRR with PVC's. Lungs show rare end expiration wheezes. Abdomen reveals mild RUQ tenderness. Negative peritoneal signs. Extremities feel cool with no edema. Lab findings reveal serum Cholesterol of 210. Triglyceride of 500. WBC-13.0; Hgb.-15.2; and blood Glucose of 122.

1. What is your differential diagnosis? (Please list in order of highest index of suspicion on a 1 to 7 scale).
   - _____ COPD
   - _____ Cholecystitis
   - _____ PUD
   - _____ Angina
   - _____ Pneumonia
   - _____ Pleurisy
   - _____ Costochondritis/Anterior Chest Wall Syndrome

2. What tests would you order? (List in order of importance on a scale of 1 to 8. (1 designating most important and 8 designating least important).
   - _____ AAS
   - _____ CXR
   - _____ EKG
   - _____ CPK/CK-MB
   - _____ Troponin I
   - _____ Gallbladder Ultrasound
   - _____ Pulse Oximeter
   - _____ Hemocult Blood Stool
   - _____ Other (Please specify: _____).

3. Please write in the space below what tests listed above are not available to you in-house in managing this case:

   _____ _____ _____

4. Please write in the space below any additional test[s] not listed in question two you would like considered and/or accessible in-house for use in managing this case:

   _____ _____ _____

Please continue on next page

Additional findings:

Further study results are obtained on this patient. Acute abdominal series show non-specific gas pattern. Chest x-ray reveals mild emphysematous changes. Normal heart size. Troponin I result is less than 0.1. EKG shows sinus tachycardia, rhythm irregular, with non-specific ST and T wave changes in the inferior leads. CPK is 215. Gallbladder ultrasound shows few echogenic shadows suggestive of Cholelithiasis. Pulse Oximeter of 94%. Hemocult Blood stool is negative.

5. Based on the additional information provided above would you admit the patient?
   _____ Yes
   _____ No

6. If you answered yes to the above question, what is your admitting diagnosis?
   _____ RUQ epigastric pain . . . r/o PUD
   _____ RUQ pain . . . r/o Cholecystitis
   _____ Right epigastric pain . . . r/o Pneumonia RLL
   _____ Atypical epigastric pain . . . r/o Anginal equivalent
   _____ RUQ epigastric pain . . . r/o Acute Chest Wall Syndrome

The End

After completion, please be sure to place the completed survey questionnaire inside the enclosed self-addressed envelope and mail. Again, thank you for your participation in this study. Your help in this project is greatly appreciated.

Appendix E

Footnotes

1. See Ricketts, Thomas C., III., Editor, (1999) of illustrations of maps in Rural Health in the United States.

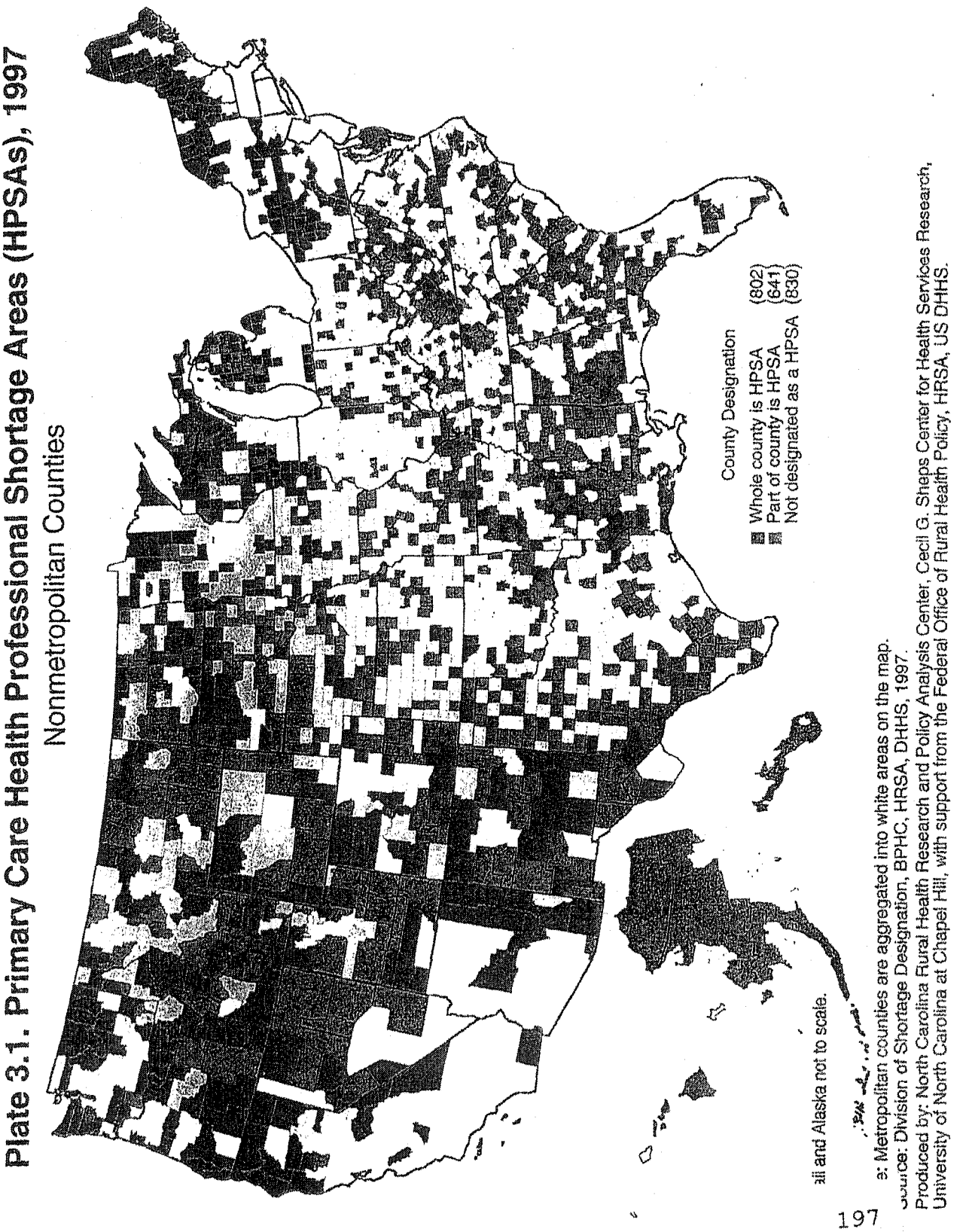
2. Copy of the survey instrument is included in the paper.

3. See Ricketts, Thomas C., III., Editor, (1999) of illustrations of maps in Rural Health in the United States and the MSUCOM fact sheet of the number of osteopathic physicians in Michigan counties, 1998.

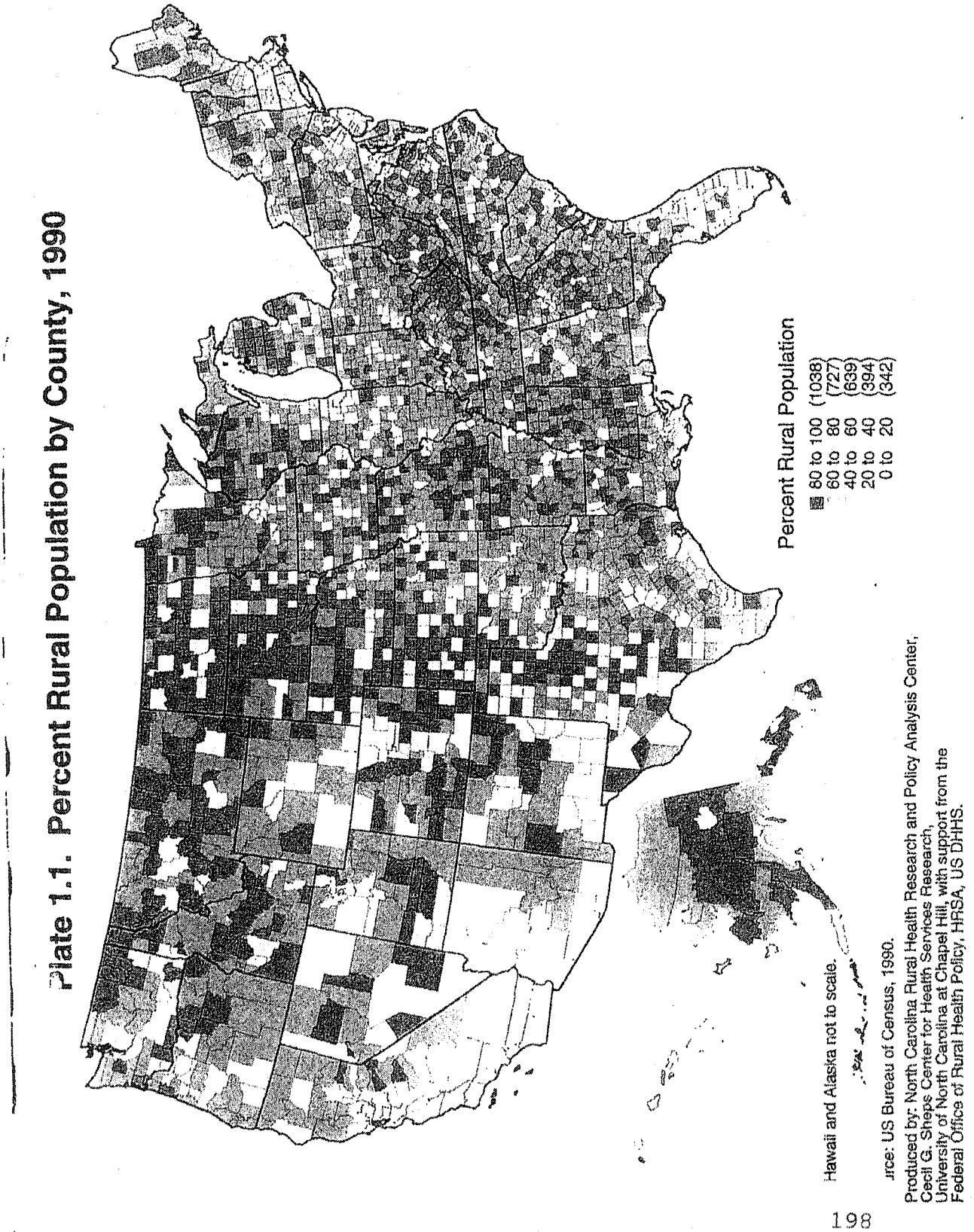
Apendix F

Maps

1. Plate 3.1 Primary Care Health Professional Shortage Areas, 1997



2. Plate 1.1 Percent Rural Population by County, 1990



3. Plate 1.2 Nonmetropolitan Counties, 1998

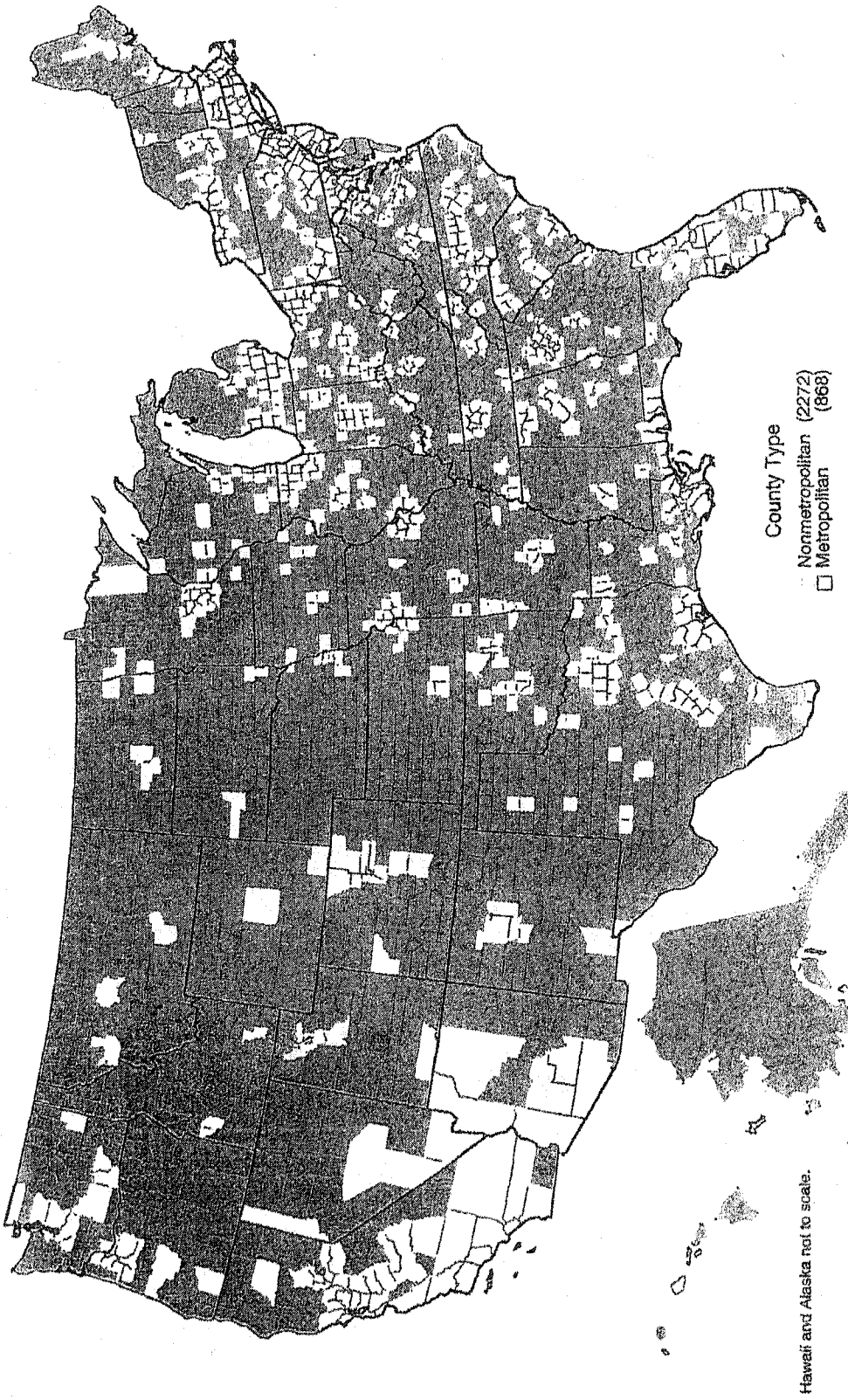
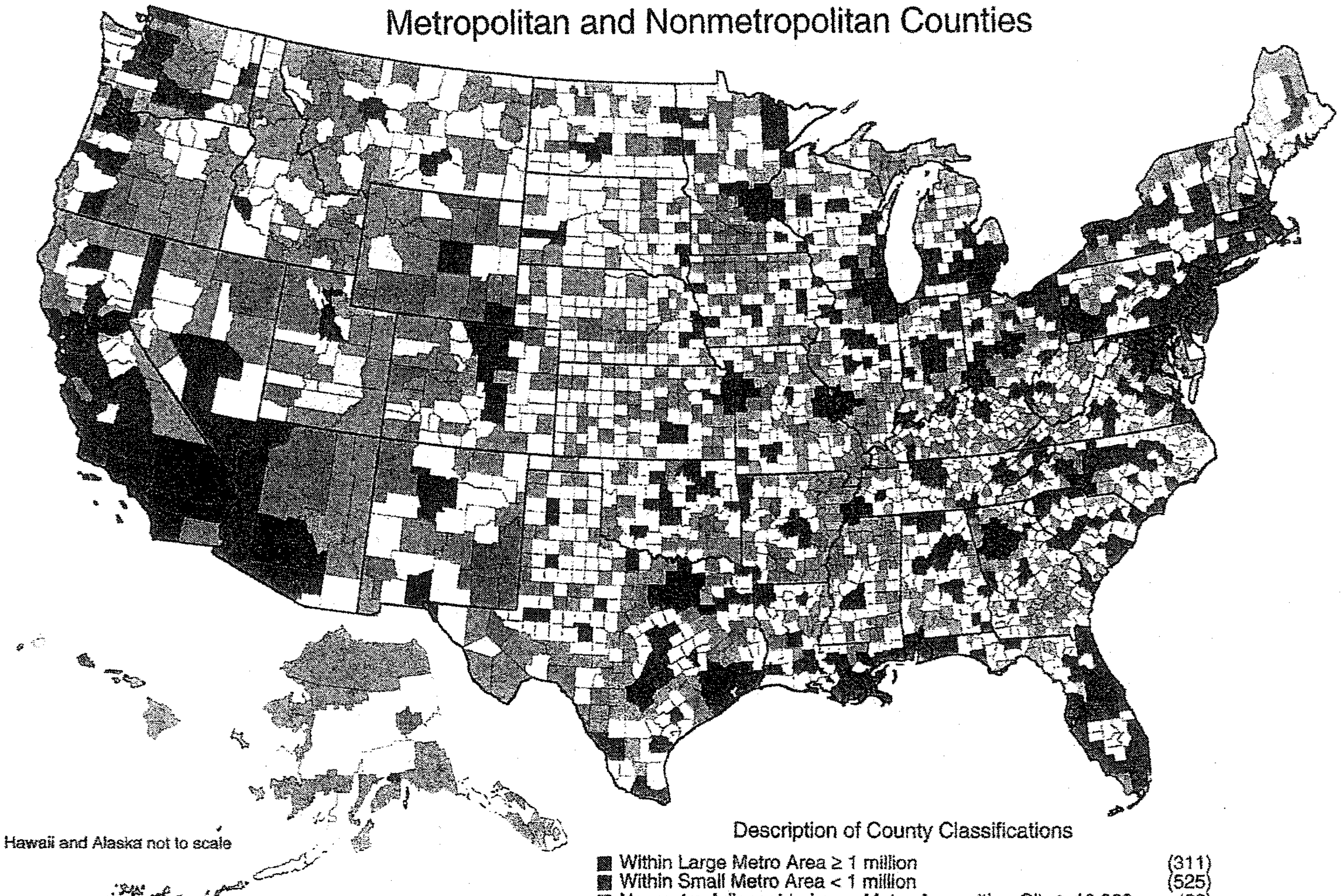


Plate 1.3. Urban Influence Codes, 1997

Metropolitan and Nonmetropolitan Counties



Description of County Classifications

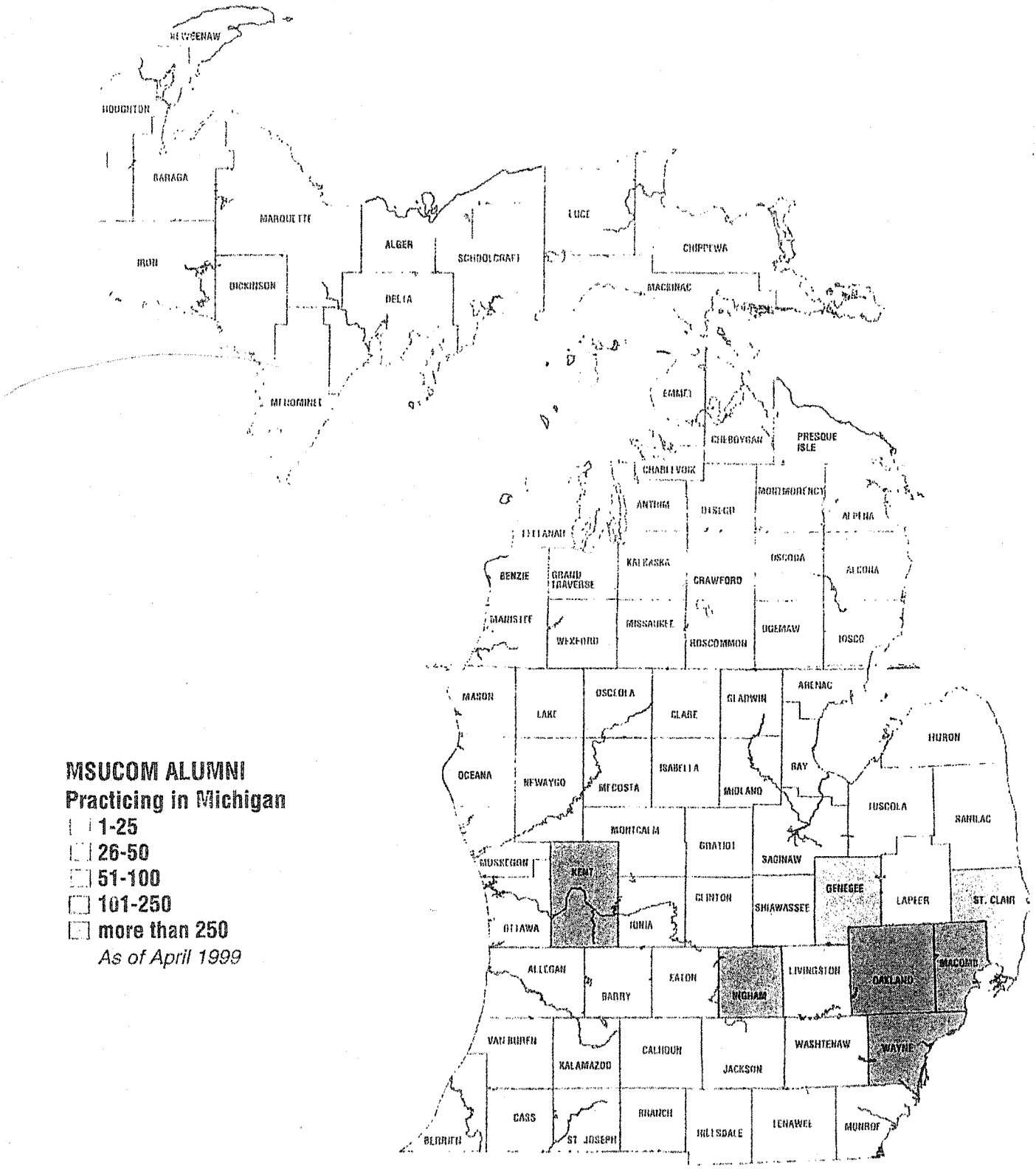
Classification	Count
Within Large Metro Area ≥ 1 million	(311)
Within Small Metro Area < 1 million	(525)
Nonmetro Adjacent to Large Metro Area with a City ≥ 10,000	(63)
Nonmetro Adjacent to Large Metro Area without a City ≥10,000	(123)
Nonmetro Adjacent to Small Metro Area with a City ≥10,000	(188)
Nonmetro Adjacent to Small Metro Area without a City ≥10,000	(627)
Nonmetro Not Adjacent to Metro Area with a City ≥ 10,000	(234)
Nonmetro Not Adjacent to Metro Area with a Town 2,500-9,999	(554)
Totally Rural, No Town ≥ 2,500	(515)

Note: Urban Influence Codes are based on 1993 OMB Metropolitan Status Designations.

Source: Rural Economy Division, Economic Research Service, US Department of Agriculture, 1997.

Produced by: North Carolina Rural Health Research and Policy Analysis Center, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

5. MSUSOM Map of number of physicians designated by Michigan counties, 1998



MSUCOM ALUMNI
Practicing in Michigan
- 1-25
- 26-50
- 51-100
- 101-250
- more than 250

As of April 1999

BIBLIOGRAPHY

Abramson, J.H. *Survey Methods in Community Medicine*, Second Edition. New York, NY: Churchill Livingstone, 1979.

Alcoff, Linda and Elizabeth Potter. eds., *Feminist Epistemologies*. New York, NY: Routledge, Chapman & Hall, Inc., 1993.

Alexander, Cheryl S., and Henry Jay Becker. *The Use of Vignettes in Survey Research*. *The Public Opinion Quarterly* 1978;v42n1:93-104.

Allen, Thomas Wesley, DO. Correcting the Misperceptions Surrounding Osteopathic Medicine. *The Journal of American Osteopathic Medicine*. February, 1990;v90n2:128.

American Heart Association. Statistical Fact Sheet-Populations. 2004. [Electronic Document]. Retrieved on April 20, 2004. www.americanheart.org.

American Medical Association. Factsheet. 2004. [Electronic Document]. Retrieved on May 3, 2004. http://www.ama.org/factsht/statistics/htm.

American Medical Women's Association. Coronary Heart Disease in Women. 2001. [Electronic Document]. Retrieved on April 24, 2004;1-2. http://www.amwa-doc.org/Education/heart_disease.htm

_____ About the American Medical Women's Association. 2003. [Electronic Document]. Retrieved on April 24, 2004;1-2. http://www.amwa-doc.org/abouta.html.

_____ Education Initiatives Fact Sheet 2001:1-2. [Electronic Document]. Retrieved on April 24, 2004:1-4. http://www.amwa-doc.org/Education/heart_disease.htm

_____ Position Paper on Women and Coronary Heart Disease. 2000. [Electronic Document]. Retrieved on April 24, 2004:1-4. http://www.amwa-doc.org/publications/Position_Papers/womenchd.htm

American Osteopathic Association. About Osteopathic Medicine. 2003. [Electronic Document]. Retrieved on April 24, 2004;1-2. http://www.oseopathic.org/index.cfm?PageID=ost main

American Osteopathic Association Fact Sheet. 2004. [Electronic Document]. Retrieved on May 3, 2004. http://www.aoa.org/factsht/statistics.htm

Anspach, Renee R. The Language of Case Presentations. In Peter Conrad, ed., *The Sociology of Health and Illness, Sixth Edition*. NY: Worth Publishers, 2001.

Armstrong, David. *An Outline of Sociology as Applied to Medicine*, 3rd Ed. London: Wright, 1989.

Barlow, William and David Powell. Homeopathy and Sexual Equality: The Controversy Over Co-education at Cincinatti's Pulte Medical College, 1873-1879. In Judith Walzer Leavitt, ed., *Women and Health in America: Historical Readings*. Madison, WI: University of Wisconsin Press, 1984.

Berger, Peter L. and Thomas Luckmann. *The Social Construction of Reality*. Garden City, NY: Doubleday & Company, Inc., 1966.

Berk, Richard A. and Peter H. Rossi. Prison Reform and State Elites: A Retrospective. In Rossi and Nock, eds., *Measuring Social Judgments*. Beverly Hills, CA: Sage Publications, 1982.

Berkman, Lisa F. and Ichiro Kawachi, eds. *Social Epidemiology*. New York, NY: Oxford University Press, 2000.

Berry, Theresa, MS, RN, CCRN. Diagnosis and Treatment of Cardiac Disease. *Heart & Lung: The Journal of Critical Care*. November/December 1995;v24 n6:427-35.

Bickel, Janet. *Women in Medicine: Rx, Getting in, Growing, and Advancing.* Thousand Oaks, CA: Sage Publications, Inc., 2000.

Bickell, Nina A., MD, MPH., Karen S. Pieper, MS., Kerry L. Lee, PhD., Daniel B. Mark, MD, MPH., Donald D. Glower, MD., David B. Pryor, MD., and Robert M. Califf, MD. Referral Patterns for Coronary Artery Disease Treatment: Gender Bias or Good Clinical Judgment? *Annals of Internal Medicine* May 15, 1992;v116n10:791-97.

Blackman, James R. Predoctoral Education for Rural Practice. In John P. Geyman, Thomas E. Norris, and L. Gary Hart, eds., *Textbook of Rural Medicine.* New York, NY: McGraw-Hill Medical Publishing, 2001.

Bodenheimer, Thomas S. and Kevin Grumbach. *Understanding Health Policy: A Clinical Approach, Third Edition.* New York: Lange Medical Books/McGraw-Hill, 2002.

Bonner, Thomas Neville. *To the Ends of the Earth: Women's Search for Education in Medicine.* Cambridge, MA: Harvard University Press, 1992.

Brannon, Linda. *Gender: Psychological Perspectives, Second Edition.* Needham Heights, MA: Allyn & Bacon, 1999.

Brook, Robert H., Rolla Edward Park, Mark R. Chassin, Jacqueline Kosecoff, Joan Keesey and David H. Solomon. *Do Patient, Physician, and Hospital Characteristics Affect Appropriateness and Outcome of Selected Procedures?* Santa Monica, CA: Rand Publication Series, 1999.

Brown, Phil, ed. *Perspectives in Medical Sociology.* Belmont, CA: Wadsworth Publishers, Inc., 1989.

Buchthal, Steven D., PhD., Jan A. Den Hollander, PhD., C. Noel Bairey Merz, MD., William J. Robers, MD., Carl J. Pepine, MD., Nathaniel Reichek, MD., Barry L. Sharaf, MD., Steven Reis, MD., Sheryl F. Kelsey, PhD., and Gerald M. Pohost, MD. Abnormal Myocardial Phosphorus-31 Nuclear Magnetic Resonance Spectroscopy in Women with Chest Pain But Normal Coronary Angiograms. *The New England Journal of Medicine.* March 23, 2000;v342n12:829-35.

Campbell, Margaret A., MD. *Why would a girl go into medicine? Medical Education in the United States: A Guide for Women,* Third Edition. Old Westbury, NY: The Feminist Press, 1973.

Canto, John G., MD, MSPH, Michael G. Shlipak, MD, MPH, William J. Rogers, MD, Judith A. Malmgren, PhD, Paul D. Frederick, MPH, MBA, Costas T. Lambrew, MD, Joseph

P. Ornato, MD, Hal V. Barron, MD and Catarina I. Kiefe, PhD, MD. Prevalence, Clinical Characteristics, and Mortality Among Patients With Myocardial Infarction Presenting Without Chest Pain. *Journal of the American Medical Association.* June 28, 2000;v283 n24:3223-29.

Carey, Timothy S., MD, MPH, Thomas M. Motyka, DO, Joanne M. Garrett, PhD and Robert B. Keller, MD. Do Osteopathic Physicians Differ in Patient Interaction from Allopathic Physicians? An Empirically Derived Approach. *Journal of the American Osteopathic Association.* July 2003;v103n7:313-318.

Center for Disease Control. Heart Disease Fact Sheet. 2004. [Electronic Document]. Retrieved on June 23, 2004. http://www.cdc.gov/cvh/library/fs_heart_disease.htm

Charon, Rita. To Listen, To Recognize. In Phil Brown, ed., *Perspectives in Medical Sociology.* Belmont, CA: Wadworth Publishing Company, 1989.

Clawson, D. Kay, and Marian Osterweis, eds. *The Roles of Physician Assistants and Nurse Practitioner in Primary Care.* Washington, DC: Association of Academic Health Centers, 1993.

Cockerham, William C. *Medical Sociology, Seventh Edition.* Upper Saddle River, New Jersey: Prentice Hall, 1998.

Conrad, Peter. *The Sociology of Health and Illness: Critical Perpectives,* Sixth Edition. New York, NY: Worth Publishers, 2001.

Cudd, Ann E. Multiculturalism as a Cognitive Virtue of Scientific Practice. In Uma Narayan and Sandra Harding, eds., *Decentering the Center: Philosophy for a Multicultural, Postcolonial, and Feminist World.* Bloomington: Indiana University Press, 2000.

Coulter, Harris L. *Divided Legacy: A History of the Schism in Medical Thought. Volume II.* Washington, DC: Wehawken Book Company, 1977.

_____ Divided Legacy: *A History of the Schism in Medical Thought. Volume III. Science and Ethics in Medicine: 1800-1914.* Washington, DC: Wehawken Book Company, 1973.

Czaja, Ronald and Johnny Blair. *Designing Surveys: A Guide To Decisions and Procedures.* Thousand Oaks, CA: Pine Forge Press, 1995.

Daniel, Eileen L., ed. *Taking Sides: Clashing Views on Controversial Issues in Health and Society,* Fourth Edition. Guilford, CT: Dushkin/McGraw-Hill Companies, 1999.

Danto, Jay B., DO and T. Reid Kavieff, DO, CSPOMM. Making a difference: The Osteopathic Approach Lecture Series. *Journal of the American Osteopathic Association*. March 1999;v99n3:168-72.

Duffy, John. *From Humores to Medical Science: A History of American Medicine*, Second Edition. Urbana and Chicago: University of Illinois Press, 1993.

Ebell, Mark H., MD, MS. *Evidence-Based Diagnosis: A Handbook of Clinical Prediction Rules*. New York: Springer-Verlag New York, Inc., 2001.

Foucault, Michel. *Power/Knowledge: Selected Interviews & Other Writings, 1972-1977*. Edited by Colin Gordon. New York: Pantheon Books, 1977.

Freund, Peter E.S., and Meredith B. McGuire. *Health, Illness, and The Social Body*, Second Edition. Englewood Cliffs, NJ: Prentice Hall, 1995.

Friedman, Emily, ed. *An Unfinished Revolution: Women and Health Care in America*. New York: United Hospital Fund of New York, 1994.

Gan, Sandra C., MD., Shelli K. Beaver, MS., Peter M. Houck, MD., Richard F. MacLehose, MS., Herschel W. Lawson, MD., and Leighton Chan, MD, MPH. Treatment of Acute Myocardial Infarction and 30-Day Mortality

Among Women and Men. *The New England Journal of Medicine*. July 6, 2000; v343,n1:8-15.

Garza, Hedda. *Women in Medicine: Women Then-Women Now*. New York, NY: Franklin Watts, 1994.

Geisler, Eliezer, and Ori Heller, eds. *Managing Technology in Healthcare*. Norwell, MA: Kluwer Academic Publishers, 1996.

Gevitz, Norman. *The DOs: Osteopathic Medicine in America*, Second Edition. Baltimore, MD: The Johns Hopkins University Press, 2004.

Geyman, John P. Graduate Education for Rural Practice. In John P. Geyman, Thomas E. Norris, and L. Gary Hart, eds., *Textbook of Rural Medicine*. New York, NY: McGraw-Hill Medical Publishing, 2001.

Geyman, John P., Thomas E. Norris, and L. Gary Hart, eds. *Textbook of Rural Medicine*. New York: McGraw-Hill 2001.

Gillium, Richard R., Michael E. Mussolino, and Jennifer H. Madans. Coronary Heart Disease Risk Factors and Attributable Risks in African-American Women and Men: NHANES 1 Epidemiologic Follow-up Study. *American Journal of Public Health*. June 1998; v88n6:913-17.

Goldstein, Michael S., Dennis T. Jaffe, Carol Sutherland and Josie Wilson. Holistic Physicians: Implications

for the Study of the Medical Profession. *Journal of Health and Social Behavior*. 1987;v28 (June):103-119.

Goldstein, Nancy. Lesbians and the Medical Profession: HIV/AIDS and the Pursuit of Visiblity. *Women Studies*. 1995.

Gonzalez-Vallejo, Claudia, et al. Physicians' Diagnostic Judgments and Treatment Decisions for Acute Otitis Media in Children. *Medical Decision Making: An International Journal of the Society for Medical Decision Making* 1998;v18 n2:149-162.

Gould, D. Using Vignettes to Collect Data for Nursing Research Studies. *Journal of Clinical Nursing*. 1996;v5n4:207-212.

Hall, Richard H. *Organizations: Structures, Processes, and Outcomes*, Sixth Edition. Englewood Cliffs, NJ: Prentice Hall, 1996.

Haller, John S. Jr. *Medical Protestants: The Eclectics In American Medicine, 1825-1939*. Carbondale and Edwardsville: Southern Illinois University Press 1994.

Harding, Sandra G., *The Science Question in Feminism*. Ithaca, NY: Cornell University Press, 1986.

_____ *Whose Science, Whose Knowledge?* Ithaca, NY: Cornell University Press, 1991.

Herholz, Harold, David C. Goff, David J. Ramsey, Frances A. Chan, Carmen Oritiz, Darwin R. Labarthe and Milton Z. Nichaman. Women and Mexican Americans Receive Fewer Cardiovascular Drugs Following Myocardial Infarction Than Men and Non-Hispanic Whites: The Corpus Christi Heart Project, 1988-1990. *Journal of Clinical Epidemiology*. 1996;v49 n3:279-87.

Hochman, Judith S. MD., Jacqueline E. Tamis, MD., Trevor D. Thompson, BS., W. Douglas Weaver, MD., Harvey D. White, MB., DSc., Frans Van De Werf, MD., Phil Aylward, BM, BCh., Erick J. Topol, MD., and Robert M. Califf, MD. Sex, Clinical Presentation, and Outcome in Patients with Acute Coronary Syndromes. *The New England Journal of Medicine*. July 22, 1999;v341n4:226-32.

Hu, Frank B., MD, Meir J. Stampfer, MD, JoAnn E. Manson, MD, Eric Rimm, ScD, Graham A. Colditz, MD, Bernard A. Rosner, PhD, Charles H. Hennekens, MD, and Walter C. Willett, MD. Dietary Fat Intake and the Risk of Coronary Heart Disease in Women. *The New England Journal of Medicine*. November 20, 1997;v337n21:1491-99.

Jenicek, Milos, MD. *Foundations of Evidenced-Based Medicine*. New York, NY: The Parthenon Publishing Group, 2003.

Johnson, Shirley M., and David Bordinat. Professional Identity: Key to the Future of the Osteopathic Medical Profession in the United States. *Journal of the American Osteopathic Association*. June 1998;v98n6:325-31.

Johnson, Shirley M., and Margot E. Kurtz. Perceptions of Philosophic and Practice Differences Between U.S. Osteopathic Physicians and Their Allopathic Counterparts. *Social Science & Medicine*. 2002;v55:2141-2148.

Jones, Thomas V., Martha S. Gerrity and Joanne Earp. Written Case Simulations: Do They Predict Physicians' Behavior? *Journal of Clinical Epidemiology*. 1990;v43n8:805-815.

Judge, Richard D, MD, James O. Woolliscroft, MD, Gerald B. Zelenock, MD and George D. Zuidema, MD, eds. *The Michigan Manual of Clinical Diagnosis: The Basis of Cost-Effective Medical Practice*. New York: Lippincott-Raven Publishers, 1998.

Kassirer, Jerome P. and G. A. Gorry. Clinical Problem Solving: A Behavioral Analysis. *Annals of Internal Medicine.* 1978;v89:245-255.

Kaufman, Martin. *Homeopathy in America: The Rise and Fall of a Medical Heresy.* Baltimore, MD: The Johns Hopkins Press, 1971.

Kearns, Cathy. Upper Peninsula Program Offers Rural Health Experience. 1998. [Electronic Document]. Retrieved April 20, 2004. http://www.com.msu.edu/communique/Spring98/UP.html

Kendrick, J. Richard Jr. *Social Statistics: An Introduction to Using SPSS for Windows.* Mountain View, CA: Mayfield Publishing Co., 2000.

Kett, Joseph. *The Formation of the American Medical Profession: The Role of Institutions - 1780-1860.* New Haven, CT: Yale University Press, 1968.

King, Lester S. *Transformations in American Medicine,* Baltimore, MD: Johns Hopkins University Press, 1991.

Kirksville College. Osteopathic Medicine Fact Sheet, 2003:1-3. [Electronic Document]. Retrieved on April 20, 2004. www.kcom.edu/admissns/osteopathic.htm.

_____ Still National Osteopathic Museum. Fact Sheet, 2003:1-4. [Electronic Document]. Retrieved on April 20, 2004. www.kcom.edu/newmuseum/astill.htm.

Korr, Irvin M. Osteopathic Medicine: The Profession's Role in Society. *Journal of the American Osteopathic Association*. September 1990;v90n9:824-837.

Krumholz, Harlan M. Racial Patterns of Coronary Heart Disease Mortality. *Women's Health Journal Watch*. 1997;v2,n12:95.

Kurtz, Margot E. PhD, Robert B. Nolan, DC,DO and William J. Rittinger, DO. Primary Care Physicians' Attitudes and Practices Regarding Complementary and Alternative Medicine. The *Journal of American Osteopathic Medicine*. December 2003;v103 n12:597-602.

Larson, Eric H. and L. Gary Hart. The Rural Physician. In John P. Geyman, Thomas E. Norris, and L. Gary Hart, eds., *Textbook of Rural Medicine*. New York, NY: McGraw-Hill Medical Publishing, 2001.

Laurence, Leslie and Beth Weinhouse. *Outrageous Practices: The Alarming Truth About How Medicine Mistreats Women*. New York: Fawcett Columbine, 1994.

Leavitt, Judith, ed. *Women and Health in America, Second Edition*. Madison, WI: University of Wisconsin Press, 1999.

Lorber, Judith. *Women Physicians: Careers, Status and Power*. New York, NY: Tavistock Publications, 1984.

Loue, Sana and Beth E. Quill, eds. *Handbook of Rural Health*. New York: Kluwer Academic/Plenum Publishers, 2001.

MacFarlane, Catharine, M.D. Women Physicians and the Medical Societies. *Transactions and Studies of the College of Physicians of Philadelphia*. 1958;V26:80-83.

Marrett, Cora Bagley. On the Evolution of Women's Medical Societies. In Judith Leavitt, ed., *Women and Health in America*. Madison, WI: University of Wisconsin Press, 1984.

Martin, Steven C., Robert M. Arnold, and Ruth M. Parker. Gender and Medical Socialization. In William C. Cockerham, *Medical Sociology*, Sixth Edition. Upper Saddle River, NJ: Prentice-Hall, Inc., 1995.

McDowell, Newell. *Measuring Health: A Guide to Rating Scales and Questionnaires*. New York, NY: Oxford University Press, 1987.

McKinlay, John B., ed. *Issues in the Political Economy of Health Care*. New York: Tavistock Publications, 1984.

McKinlay, John, Ting Freund Lin, and Karen Moskowitz. The Unexpected Influence of Physician Attributes on Clinical Decisions: Results of an Experiment. March, 2002. [Electronic document] Retrieved on April 18,

2004. *Journal of Health & Social Behavior*. March, 2002;v43n1:92-106.

Michigan Department of Community Health. *Rural Health Initiative (RHI) Funding Abbreviated EMS Equipment and Educational Assistance Health Grant Application*. March 2, 2001:1-33.

Michigan Osteopathic Association. Osteopathic Medicine. 2003. Fact Sheet [Electronic Document]. Retrieved on April 20, 2004. www.moa-do.com/OsteoMed/medicinewhatis.htm

Miller, Katherine. The Evolution of Professional Identity: The Case of Osteopathic Medicine. *Social Science & Medicine*. 1998;v47n11:1739-1748.

Morantz-Sanchez, Regina. The Gendering of Empathic Expertise: How Women Physicians Became More Empathic Than Men. In Judith Walzer Leavitt, ed., *Women and Health in America*, Second Edition. Madison, WI: University of Wisconsin, 1999.

More, Ellen S. *Restoring the Balance: Women Physicians and the Profession of Medicine, 1850-1995*. Cambridge, MA: Harvard University Press, 1999.

Motz, Marilyn Ferris. *True Sisterhood: Michigan Women and Their Kin, 1820-1920*. Albany, NY: State University of New York Press, 1983.

National Coalition for Women with Heart Disease. 2004. Coalition Fact Sheet. [Electronic Document]. Retrieved May 3, 2004. http://www.womenheart.org/about_us_coalition_fact_sheet.asp

Nesbitt, Thomas S. and Christina A. Kuenneth. Rural Hospitals, Consultation, and Referral Networks in Rural Practice. In John P. Geyman, Thomas E. Norris, and L. Gary Hart, eds., *Textbook of Rural Medicine.* New York, NY: McGraw-Hill Medical Publishing, 2001.

Oddone, Eugene Z., Laura A. Petersen, and Morris Weinberger. Health-Care Use in the Veterans Health Administration: Racial Trends and the Spirit of Inquiry. In Smelzer, Wilson and Mitchell, eds., *America Becoming: Racial Trends and Their Consequences.* Washington, DC: American Academy Press, 2001.

Peck, Phoebe. Women Physicians and their State Medical Societies. *Journal of the American Medical Women's Association.* 1965;V20:351-353.

Pellegrino, Edmund D., and David C. Thomasma. *A Philosophical Basis of Medical Practice: Toward a Philosophy and Ethic of the Healing Professions.* New York: Oxford University Press, 1981.

Peterson, Barbara. A Compilation of the Thoughts of George W. Northup, DO, On the Philosophy of Osteopathic Medicine. The *Journal of American Osteopathic Medicine*. January 1998;v98n1:53-57.

Petrie, Mark C., Nuala F. Dawson, David R. Murdoch, Andrew P. Davie, and John V. McMurrary, MD. Failure of Women's Hearts. *Circulation*. 1999; v99:2334-41.

Philpott, Sue, Petra M. Boynton, Gene Feder, and Harry Hemmingway. Gender Differences in Descriptions of Angina Symptoms and Health Problems Immediately Prior to Angiography: The ACRE Study. *Social Science and Medicine*. 2001;v52:1565-75.

Raczynski, James M., Herman Taylor, Gary Cutter, Michael Hardin, Neil Rappaport, and Albert Oberman. Diagnoses, Symptoms, and Attribution of Symptoms Among Black and White Inpatients Admitted for CHD. *The American Journal of Public Health*. June 1994;v84n6:951-57.

Relman, Arnold S. The Trouble with Rationing. *New England Journal of Medicine*. 1990;v323n11:911-913.

Ricketts, Thomas C., III., ed. *Rural Health in the United States*. New York: Oxford University Press, 1999.

Riska, Elianne. *Medical Careers and Feminist Agenda*. Hawthorne, NY: Aldine De Gruyter, 2001.

Riska, Elianne, and Katarina Wegar, eds. *Gender, Work and Medicine: Women and the Medical Division of Labour.* Newbury Park, CA: Sage Publications, Inc., 1993.

Rosen, George. *The Structure of American Medical Practice, 1875-1941.* Philadelphia, PA: University of Pennsylvania Press, 1983.

Rosenblatt, Roger A. and L. Gary Hart. Physicians and Rural America. In Thomas C. Ricketts, III, ed. *Rural Health in the United States.* New York, NY: Oxford University Press, 1999.

Rosenquist, P. B., C. C. Colenda, J. Briggs, S. I. Kramer and M. Lancaster. Using Case Vignettes to Train Clinicians and Utilization Reviews to Make Level-of-Care Decisions. *Psychiatric Services.* 2000;v51n11: 1363-1365.

Rosser, Sue V. *Women's Health-Missing from U.S. Medicine.* Bloomington, IN: Indiana University Press, 1994.

Rossi, Peter H., and Steven L. Nock. *Measuring Social Judgments: The Factorial Survey Approach.* Beverly Hills, CA: Sage Publications, 1982.

Roter, Debra L. and Judith A. Hall. *Doctors Talking With Patients/Patients Talking With Doctors: Improving Communication In Medical Visits.* Westport, CT: Auburn House, 1992.

Roter, Debra L., and Judith A. Hall. How Physician's Gender Shapes the Communication and Evaluation of Medical Care. *Mayo Clinic Proceedings*. 2001;v76:673-676.

Rothstein, William G. *American Physicians in the 19th Century: From Sects to Science*. Baltimore, MD: Johns Hopkins University Press, 1972.

Sammons, Morgan T. Nonphysician Prescribers in Rural Settings:Unique Roles and Opportunities for Enhanced Mental Health Care. In B. Hudnall Stamm, ed., *Rural Behavioral Health Care*. Washington DC: American Psychological Association, 2003.

Sayers, Janet. Science, Sexual Difference, and Feminism. In Beth B. Hess and Myra Marx Ferree, eds., *Analyzing Gender: A Handbook of Social Science Research*. Newbury Park, CA: Sage Publications, Inc., 1987.

Scheibel, Dains Baumann. *Advanced Health Assessment and Clinical Diagnosis in Primary Care*. St. Louis, MO: Mosby, Inc., 1998.

Schulman, Kevin A., MD., Jesse A. Berline, ScD., William Harless, PhD., Jon F. Kerner, PhD., Shyrl Sistrunk, MD., Bernard J. Gersh, MB., ChB., Dphil., Ross Dube, Christopher K. Taleghani, MD., Jennifer E. Burke, MA., MS., Sankey Williams, MD., John M. Eisenberg,

MD., and Jose J. Escarce, MD., PhD. The Effect of Race and Sex on Physician's Recommendations for Catheterization. *The New England Journal of Medicine*. February 25, 1999;v340n8:618-26.

Schulz, A., B. Israel, D. Williams, E. Parker, A. Becker, and S. James. Social Inequalities, Stressors and Self-Reported Health Status Between African American and White Women in the Detroit Metropolitan Area. *Social Science & Medicine*. 2000;v52:1639-53.

Schutt, Russell K. *Investigating the Social World: The Process and Practice of Research*. Thousand Oaks, CA: Pine Forge Press, 1996.

Schwartz, Howard D. *Dominant Issues in Medical Sociology*, Third Edition. McGraw-Hill, Inc., 1994.

Science Daily News Release: *Chemical Marker Of Heart Muscle Death*. (2001) [Electronic Document]. Retrieved on 3/12/03. http://www.sciencedaily.com/releases/2001.

Sekikawa, MD, PhD, Akira and Lewis H. Kuller, MD., DrPH. Striking Variation in Coronary Heart Disease Mortality in the United States among Black and White Women Aged 45-54 by State. *Journal of Women's Health & Gender-Based Medicine*. 2000;v9n5:545-55.

Seller, Robert H., MD. *Differential Diagnosis of Common Complaints, Fourth Edition.* Philadelphia, PA: W.B. Saunders Company, 2000.

Selmon, Bertha L., M.D. History of Women in Medicine: Early History of Women In Medicine. *The Medical Woman's Journal.* 1946;V53:44-48.

_____ History of Women in Medicine: Early Development of Medical Opportunity For Women in the United States. *The Medical Woman's Journal.* January 1947;V54.:25-28.

Shiliak, Michael G., MD, MPH, Darryl A. Elmouchi, MD, David M. Herrinton, MD, MHS, Feng Lin, MS, Deborah Grady, MD, MPH, and Mark A. Hlatky, MD. The Incidence of Unrecognized Myocardial Infarction in Women with Coronary Heart Disease. *Annals of Internal Medicine.* 2001;v134n11:1043-47.

Simpson, Christopher, DO and Martha A. Simpson, DO. Complexity of the Healthcare Crisis in Rural America. *Journal of the American Osteopathic Association Health Policy Issue,* June 1994;v94n6:502-508.

Sinatra, Stephen T., MD, Jan Sinatra, RN, MSN and Roberta Jo Lieberman. *Heart Sense for Women: You Plan for Natural Prevention and Treatment.* Washington, DC: Plume, 2000.

Skaner, Y., J. Bring, B. Ullman and L. E. Strender. The Use of Clinical Information in Diagnosing Chronic Heart Failure: A Comparison Between General Practitioners, Cardiologists, and Students. *Journal of Clinical Epidemiology*. 2000;v53n11:1081-1088.

Smith, Dorothy E. *The Everyday World As Problematic: A Feminist Sociology*. Boston, MA: Northeastern University Press, 1987.

Souare, Gail E. Health Education: Community-Based Models. In Sana Loue and Beth E. Quill, eds., *Handbook of Rural Health*. New York, NY: Kluwer Academic/Plenum Publishers, 2001.

Starr, Paul. The Growth of Medical Authority. In Phil Brown, ed., *Perspectives in Medical Sociology*. Belmont, CA: Wadsworth Publishing Company, 1989.

_____ *The Social Transformation of American Medicine: The Rise of a Sovereign Profession and the Making of a Vast Industry*. New York, NY: Basic Books/The Perseus Books Group, 1982.

Steven, Ian D. *Patient Presentations in General Practice: A Comprehensive Guide to Diagnosis and Management*. Roseville, NSW: McGraw-Hill Australia, 1999.

Stimson, Gerry and Barbara Webb. Face-to-Face Interaction. In Phil Brown, ed., *Perspectives in Medical*

Sociology. Belmont, CA: Wadsworth Publishing Company, 1989.

Sudman, Seymour, Norman M. Bradburn, and Norbert Schwarz. *Thinking About Answers: The Application of Cognitive Processes to Survey Methodology*. New York, NY: John Wiley & Sons, 1996.

Szczepura, Ala and Jari Kankaanpaa. *Assessment of Health Care Technologies: Case Studies, Key Concepts and Strategic Issues*. New York, NY: John Wiley & Sons, Inc., 1996.

Tooke-Rawlins, Dixie, DO. Rural Osteopathic Family Physician Supply: Past and Present. *The Journal of Rural Health*. Summer, 2000;v16:299-300.

University of Michigan. *The Homoeopathic Medical College: Second Annual Announcement, 1876-77*. Ann Arbor, MI: Courier Steam Printing House, 1876.

U.S. News and World Report. Medical School Directory. 2004. [Electronic Document]. Retrieved on June 12, 2004. http://www.usnews.com/usnews/edu/grad/directory/dir-med/dirmedindex_brief.php

Vaccarino, Viola MD., PhD., Loris Parson, BS., Nathan R. Every, MD., MPH., Hal V. Barron, MD., and Harlan M. Krumholz, MD. Sex-Based Differences in Early

Mortality After Myocardial Infarction. *The New England Journal of Medicine.* July 22, 1999; v341n4:217-25.

Verbrugge, Martha H. *Able-Bodied Womanhood.* New York, New York: Oxford University Press, 1988.

Vertinsky, Patricia A. *The Eternally Wounded Woman: Women, Doctors, and Exercise in the Late Nineteenth Century.* Urbana and Chicago, IL: University of Illinois Press, 1994.

Walsh, Mary Roth. *Doctors Wanted: No Women Need Apply: Sexual Barriers in the Medical Profession, 1835-1975.* New Haven, CT: Yale University Press, 1977.

Weaver, Douglas W., Harvey D. White, Robert G. Wilcox, Phillip Aylward, Douglas Morris, Alan Geuerci, Magnus Ohman, Gabriel Barbash, Amadeo Betriu, Zygmut Sadowski, Erick Topol, and Robert M. Califf. Comparisons of Characteristics and Outcomes Among Women and Men with Acute Myocardial Infarction Treated with Thrombolytic Therapy. *Journal of the American Medical Association.* March 13, 1996;v275n10:777-84.

Weitz, Rose. *The Sociology of Health, Illness, and Health Care: A Critical Approach, Third Edition.* Belmont, CA: Wadsworth/Thomson Learning, 2004.

Wilkerson, Abby L. *Diagnosis: Difference. The Moral Authority of Medicine.* Ithaca, NY: Cornell University Press, 1998.

Winstead-Fry, Patricia and Elizabeth Wheeler. Rural Women's Health. In Sana Loue and Beth E. Quill, eds., *Handbook of Rural Health.* New York, NY: Kluwer Academic/Plenum Publishers, 2001.

Women's Health Initiative. Fact Sheet: 1-2. Women's Health Initiative Background and Overview. No date given. [Electronic Document]. Retrieved May 3, 2004. http://www.nhlbi.nih.gov/whi/factsht.htm

Woolliscroft, James O., MD. Medical History. *The Michigan Manual of Clinical Diagnosis.* Philadelphia, PA: Lippincott-Raven Publishers, 1998.

Yawn, Barbara P. Rural Meeical Practice: Present and Future. In Barbara P. Yawn, Angeline Bushy, and Roy A. Yawn, eds., *Exploring Rural Medicine: Current Issues and Concepts.* Thousand Oaks, CA: Sage Publications, Inc., 1994.

Yawn, Barbara P., Angeline Bushy, and Roy A. Yawn, eds. *Exploring Rural Medicine: Current Issues and Concepts.* Thousand Oaks, CA: Sage Publications, Inc., 1994.

Zarling, Edwin J., Harold Sexton and Pervis Milnor, Jr. Failure to Diagnose Acute Myocardial Infarction: The Clinicopathologic Experience in a Large Community Hospital. *Journal of the American Medical Association*. 1983;v250n9:1177-1181.

Zimmerman, Mary K. The Women's Health Movement: A Critique of Medical Enterprise and the Position of Women. In Beth B. Hess and Myra Marx Ferree, eds., *Analyzing Gender: A Handbook of Social Science Research*. Newbury Park, CA: Sage Publications, Inc., 1987.