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Patient And Provider Characteristics And Practice Patterns of Primary Care Physicians Of Weight-Related Counseling

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PATIENT AND PROVIDER CHARACTERISTICS AND PRACTICE PATTERNS OF
PRIMARY CARE PHYSICIANS OF WEIGHT-RELATED COUNSELING

by

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DEDICATION

I dedicate this work to my husband, Kevin Brodie Redd, for his enduring support during my graduate studies at the University of South Carolina Health Services Policy and Management PhD program in the Arnold School of Public Health. I would not have made it to graduation without his support and encouragement during this program which began the first year we were married. Thank you for your love, concern, support, and encouragement throughout the last 3 years.

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ABSTRACT

Background: The United States Preventive Services Task Force (USPSTF) recommends three types of health education counseling for use in primary care practices for adult, obese patients. While these recommendations are well known, a low percentage of physicians provide this counseling to their patients on a consistent basis. There are inconsistencies in past studies in regards to what aspects of the health encounter influence the likelihood of receiving health education counseling during a primary care visit. The objective of this study was to (1) investigate the patterns of these three types of counseling occurring within primary care practices and to (2) investigate the influence of patient and provider characteristics on counseling within primary care practices. **Methods:** We analyzed aggregated data from the 2008-2010 National Ambulatory Medical Care Survey (NAMCS). The three types of health education counseling were the dependent variables, while patient and provider characteristics were the independent variables. **Results:** Of the 11,041 obese patients seen, 70.3% had no type of counseling provided while only 7.6% had all three types of recommended counseling provided. The highest combination of counseling provided was diet/nutrition and exercise counseling, while the lowest combination was exercise and weight reduction counseling. Additionally, the odds of receiving all 3 types of health education counseling are increased for patients when their obesity check box is checked, being seen for a preventive care visit, having Class III obesity, and seen within an urban practice.

Conclusion: Although physicians see a vast amount of adult obese patients within primary care practice, health education counseling practices by primary care physicians remains less than optimal. Therefore, there is a drastic need to improve this type of health education counseling by primary care physicians in order to address the current obesity epidemic in the U.S.

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LIST OF ABBREVIATIONS

AHA .... American Heart Association

AHRQ .... Agency for Healthcare Research and Quality

BMI .... Body Mass Index

BRFSS .... Behavior and Risk Factor Surveillance System

CDC .... Centers for Disease Control and Prevention

CVD .... Cardiovascular Disease

EMR .... Electronic Medical Record

NAMCS .... National Ambulatory Medical Care Survey

NCHS .... National Center for Health Statistics

NGC .... National Guidelines Clearinghouse

PCP .... Primary Care Physician

PSO .... Patient Safety Organizations

PSQIA .... Patient Safety and Quality Improvement Act

PSU .... Primary Sampling Unit

USPSTF .... United States Preventive Services Task Force

WHO .... World Health Organization

WLC .... Weight Loss Counseling

CHAPTER 1 INTRODUCTION

1.1 INTRODUCTION TO THE STUDY

Background

Evidence suggests that by 2040 roughly half of the adult population in the United States (US) will be obese.[1,2] An individual is categorized as obese if his or her Body Mass Index (BMI) is greater than or equal to 30.0 kg/m^2. Furthermore, approximately one in twenty Americans has a BMI greater than 40 kg/m^2.[3] Several reports and studies suggest that the increasing prevalence of overweight and obesity within the US reflects numerous changes within society and behaviors over the past 30 years.[4] Lyznicki and associates state that reversing these documented trends will require changes in individual behavior and the elimination of societal barriers to ensuring healthy lifestyle choices.[4] Primary care physicians are placed in a unique setting where they have the ability to provide private counseling on these health matters with their obese adult patients. However, it has been noted that primary care physicians do not routinely offer this counseling to their patients.[5]

1.2 STATEMENT OF THE PROBLEM

Changes in Obesity Overtime

Historically, the prevalence of obesity increased between 1976 and 2000.[2,6] From the years of 1976 to 1980 alone, the prevalence of obesity and overweight in the US increased by 134%.[3,7] In 2007-2008, the age-adjusted prevalence of obesity was 33% overall, with 32.2% among men and 35.5% among women.[2,8,9] The corresponding

prevalence estimate for overweight and obesity combined was 68.0%.[2,8] One study revealed that enhanced efforts to provide environmental interventions may lead to improved health and future decreases in the prevalence of obesity.[2] The Centers for Disease Control (CDC) Healthy People 2010 objectives were defined in 2001; however, the final review of those objectives reported that almost no progress has been made towards the focus area of nutrition and obesity within the last decade.[10] The effects of obesity are many and include not only medical, psychological, and economic, but also healthcare-related and productivity costs to society.[11]

With the increasing prevalence of obesity, the US population now leads the world in obesity rates.[12,13] With 68% of US adults overweight or obese, approximately 145 million adults are affected by this epidemic, which has had deep economic and public health consequences.[14,15] This epidemic may stall the increase in life expectancy seen during the past two centuries in the US.[16] The obesity epidemic spreads at rates usually seen for communicable disease.[17] Thus, obesity should be recognized and treated as a primary medical condition that is progressive, chronic, and relapsing.[17] Obesity is a significant public health issue, requiring attention from all segments of society, including healthcare clinicians, in order to halt the impact at the individual and societal levels.[18]

Complications of Obesity

Obesity has been found to decrease health-related quality of life and overall life expectancy.[19] When age and race are taken into account, obesity has been shown to be associated with a 6 to 20 year decrease in life expectancy.[3] One study revealed that relative to normal weight, both obesity (all grades) and grades 2 and 3 obesity were associated with significantly higher all-cause mortality.[20] Scientific, medical, and

behavioral data link excess adiposity and coronary heart disease; therefore, this information led the American Heart Association (AHA) to reclassify obesity as a major, modifiable risk factor for coronary heart disease.[21] Additionally, obesity increases the risk of type 2-diabetes, high blood pressure, heart disease, certain types of cancer, stroke, and many other diseases and conditions that carry high financial costs, can be devastating to quality of life, and cause millions of deaths annual.[1,22,23] Field and colleagues found during a 10 year follow-up, the incidence of type 2-diabetes, gallstones, hypertension, heart disease, colon cancer, and stroke (for men only) increased with degree of overweight in both men and women.[24] They also found that adults who were overweight, but not obese were at significantly increased risk of developing numerous health conditions.[24] Consequently, they found a dose-response relationship between BMI and risk of developing chronic disease among adults in the upper half of the healthy weight range and suggest that adults should try to maintain a BMI between 18.5 and 21.9 to minimize their risk of disease.[24] Obesity also complicates management of such diseases as osteoarthritis, sleep apnea, and chronic obstructive lung disease, making it of concern to a range of specialty physicians.[25] This largely preventable condition and its associated comorbidities place unnecessary stress on healthcare systems and use resources that are already scarce.[19]

Costs related to Obesity

In addition to the adverse health effects associated with obesity, studies have found that obesity accounts for 5% to 7% of national health expenditures in the US.[26] With rising prevalence, increased comorbidities, and a spreading epidemic, obesity is associated with $2,741 higher than average annual medical care costs (in 2005 dollars)

with $3,613 for women and $1,152 for men.[27] Thus, in 2005, estimates of the national medical care costs of obesity-related illness in adults were $209.7 billion, twice the estimate of $85.7 billion in earlier literature.[27] It has been noted that previous literature underestimated the medical costs of obesity, resulting in underestimates of the economic rationale for government intervention to reduce obesity-related externalities.[27] The comorbid medical conditions of obesity are associated with higher use of health care services and costs among these patients.[10] Withrow and colleagues report that obese individuals were found to have medical costs that were approximately 30% greater than their normal weight peers.[19] These excess medical costs, attributable to obesity, have also been found to equal or exceed those of smoking in the US.[19] Another study found that the physical inactivity that accompanies obesity accounted for 23% of health plan charges and 27% of national health care charges.[26] With the enormous costs both fiscally and physically, the US is facing a major health problem.[26] With the overall rising cost of healthcare within the country and targeted goals to lower the cost, it is imperative to target these high-cost preventable conditions.

1.3 RATIONALE FOR THE STUDY

Eighty percent of Americans cite their physician as their primary source of information about health, with the average adult making 2.7 visits to a physician per year.[5] Hence, clinicians, specifically physicians, represent a credible source of health information for their patients, who may be receptive to information about their health during office visits.[5] Furthermore, patient-centered clinical services present a unique opportunity to reinforce and complement other sources of health advice or information.[5] Yet, a 2005 national study illustrated a trend of decreasing prevalence of weight loss

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advice to obese patients and another showing primary care physician assessment and behavioral management of overweight and obesity in adults at a low level relative to the magnitude of the problem.[28,29] Moreover, rates of weight loss counseling in primary care have significantly declined despite increased rates of overweight and obesity in the US.[14] In light of the US' obesity epidemic and associated preventable morbidity and mortality, economic burden, and emotional distress, there needs to be a consistent, wide-spread practice of health education counseling among primary care physicians and their obese patients.

Purpose of the Study

Given the previously discussed risk factors of obesity and the continued increase in obesity prevalence, this study seeks to examine the prevalence and correlates of primary care physician's concordance with the United States Preventive Services Task Force (USPSTF) recommendations for obese adult patients using the National Ambulatory Medical Care Survey (NAMCS) data. This survey's data has not been examined since 2008; thus, this study will be looking to see if counseling practices remain the same or if there have been significant changes made as obesity becomes more discussed throughout the world. The findings from this study can be used to determine what patient characteristics influence the physician's behavior to provide the counseling during a visit, as well as what types of counseling are provided and in what combinations. This type of research has been completed before with inconsistent findings regarding patient and provider characteristics; nonetheless, it has not been re-examined since 2008. Thus, trends could have changed and the results of this study from 2008-2010 could yield new information on the topic of health education counseling in primary care practice

among adult, obese patients. This information will aid physicians in their practice in promoting the health education counseling that is recommended for adult obese patients within their practice.

Research Questions

This study will answer the following research questions:

1. What type of health education counseling is provided the most, least, and in what combinations: (a) diet/nutrition, (b) exercise, and (c) weight reduction.

2. What patient and provider characteristics influence the physician's behavior to provide these types of counseling?

Hypotheses

1. I hypothesize that when physicians provide only one type of counseling it will be diet/nutrition health education to their patients in an effort to promote weight-loss. Furthermore, I hypothesize that when physicians provide a combination of counseling it will be diet/nutrition and exercise health education.

2. I hypothesize that physicians will provide more overall health education counseling to women, younger adults, those individuals with higher BMI and obesity class levels, providers with a DO degree, and providers with EMR clinical reminders turned on when compared with men, older adults, those will lower obesity class levels, physicians with a MD degree, and practices without EMR clinical reminders turned on.

This document is presented in the following format: Chapter 1 provides basic background information and research questions for the study; Chapter 2 provides an in-

depth presentation of relevant research; Chapter 3 provides the methodology for the study; Chapter 4 provides a transcript on the patient characteristics that influence health education counseling in primary care practice; Chapter 5 provides a transcript on the provider characteristics that influence health education counseling in primary care practice; and Chapter 6 provides a conclusion from the two transcripts.

2.1 REVIEW OF RELATED LITERATURE

Historical Overview of the Problem

The etiology of obesity is complex and multifactorial in nature. It is dynamic and encompasses genetic, physiological, environmental, psychological, social, economic, and even political factors that all, to varying degrees, promote obesity.[30] This can range from lifestyle choices such as excess food intake, overabundance of calorie-dense foods in the home, use of medications that have undesirable weight gain, and decreased opportunities and motivation for physical activity.[4,30] Additionally, more recently economic and political determinants of available foodstuffs contribute more frequently to obesity than in prior years.[30] Arrone and colleagues illustrate the complex etiology of obesity in Figure 2.1. This illustration reveals that environmental agents assist in the development of obesity and includes food or food-related products, physical inactivity, certain drugs, toxins, and viruses.[30] Arrone and colleagues further state that if food is in limited supply, obesity does not develop; however, in a susceptible host, the toxic effect of too much food or certain food-related products produces obesity.[30] It can be said that obesity is led in part by commercial drivers. "Commercial drivers are so influential that obesity can be conserved a robust sign of commercial success – consumers are buying more food, more cars, and more energy saving machines,".[30] Yet, it is extremely unlikely for these economic forces to change based on consumer desires to eat less and corporate desires to
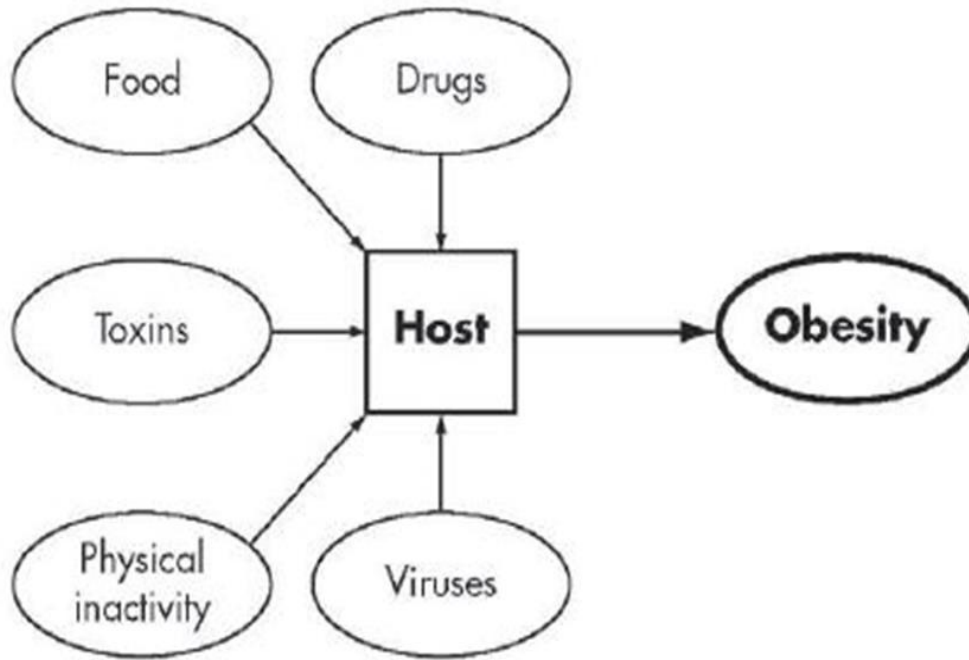
Figure 2.1: *Arrone and Colleagues environmental agents contributing to obesity.*

be more socially responsible. Obesity now meets all accepted criteria of a medical disease, including known etiology, recognizing signs and symptoms, and a range of structural and functional changes that accumulate in pathologic consequences within the body. As a result, many people believe this is an issue for physicians to handle since it can be classified as a disease; whereas, medical professionals can see this as an environment problem.[30]

Obesogenic environment is a new term that has emerged as a result of the obesity epidemic. Obesogenic environment is the sum of influences that the surroundings, opportunities or conditions of life have on promoting obesity in individuals and populations.[31] These environments are collectively known to predispose, enable or reinforce ways of living that promote or inhibit the consumption of high caloric foodstuffs, while also discouraging physical activity.[31] According to the US surgeon general, approximately 25% of American adults are completely sedentary, and more than 60% are not regularly active at the recommended level of 30 minutes per day.[4] Therefore, the American population and physicians look for best practices and clinical recommendations in an effort to treat this epidemic more effectively.

Measurement of Obesity

There is debate over the best method to measure adiposity risk or current health status in in obese patients. The AHA has adopted BMI as an indicator to measure adiposity.[21] Therefore, many other physicians and medical professionals use this method in practice as well. Yet, many argue that obesity should be measured by waist circumference rather than BMI. Their argument is backed by the fact that waist circumference specifically measures abdominal obesity; whereas, BMI is a measure of

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total body fat.[30] Furthermore, several studies reveal that abdominal adiposity, particularly visceral fat, is a better predictor of increased risk of disease than overall body fat.[30]

Obesity has been found to be associated with an increase in adverse health effects. Furthermore, central adiposity has been found to increase the risk for cardiovascular disease (CVD) and multiple other diseases independent of obesity. Therefore, the USPSTF states that physicians may use waist circumference as a measure of central adiposity but not for measurement of obesity.[32] The USPSTF classifies obesity into three distinct classes included Class I as BMI of 30 kg/m^2 – 34.9 kg/m^2, Class II as BMI of 35 kg/m^2 – 39.9 kg/m^2, and Class III as BMI of 40 kg/m^2 or higher.[32] Consequently, until another standard that does not use BMI for measurement is accepted, BMI will continue to be the most accurate clinical measure of obesity.

Current treatment and management of obesity

There are several different types of treatment that are recommended for those individuals who are categorized as obese based on their BMI. However, successful management of obesity requires understanding and acceptance of a new paradigm that identifies obesity as a disease that requires treatment over time.[30] Obesity management has also been closely linked to lifestyle changes, which can be difficult for many people to make and require a great deal of support from health care professionals and the community.[16,33] Effective management has also been linked to involvement from primary care professionals, nurses, community health workers, and dieticians, as well as secondary care workers.[10] Physician involvement is necessary for medical assessment, management, counseling, and coordination of obesity treatment.[17] Obesity is currently

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responsible for 61.8 billion dollars of Medicare and Medicaid spending annually.[34] Yet, behavioral counseling of any kind was not covered until 2011.[33,34]

Many physicians have worked towards incorporating different office-based strategies to assist their obese patients during their visits. Some commonly documented strategies include making recommendations for assisted self-management, guidance on popular diets, advising the patient about commercial weight-loss programs, advising patients about and prescribing medications, recommending bariatric surgery, and supplementing these strategies with counseling.[35] A common approach is to utilize the 5-A framework for behavioral counseling. The 5-A framework is based on the physician *assessment*, *advising*, *agreeing*, *assisting*, and *arranging* interventions to help with weight loss.[32,35] Overall, research has collectively shown that behaviorally based treatments resulted in 3kg greater weight loss in intervention groups than control participants after 12-18 months, while also finding that more treatment sessions were associated with greater weight loss.[36]

The Joint Guidelines from the National Institutes of Health, the National Heart, Lung, and Blood Institute, and the North American Association for the Study of Obesity all recommend three levels of treatment based on BMI and presence or lack of comorbidities.[30] Lifestyle modification (increased physical activity, reduced-calorie diet, and behavior modification) are recommended for all patients whose BMI is equal to or greater than 25 kg/m^2; whereas, pharmacotherapy is recommended for patients with a BMI of 27 kg/m^2 – 29.9 kg/m^2 or 25 kg/m^2 if they have comorbidities, or a BMI of 30 kg/m^2 or greater with no comorbidities. Recommendations for weight loss surgery is currently reserved for those who are severely obese, those with a BMI equal to or greater

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than 35 kg/m^2 with comorbidities, or those with a BMI equal or greater than 40 kg/m^2 with or without comorbidities.[30] With several different options in place, population based strategies that improve social and physical environments are often the basis of non-clinical strategies in addressing obesity.[2] Thus, physicians have an integral part to play in all of the treatment options and management strategies for obese patients.

Obesity policy related to healthcare practice

The Patient Safety and Quality Improvement Act (PSQIA) was signed into law on July 29, 2005 as a response from the Federal Government to the 1999 Institutes of Medicine report and established a system of Patient Safety Organizations (PSOs). The system in the US contains the Agency for Healthcare Research and Quality (AHRQ) which has a National Guideline Clearinghouse (NGC) that is responsible for establishing guidelines and recommendations physicians use for best practices. The NGC relies on the USPSTF for developing the evidence-based recommendations and guidelines. USPSTF makes recommendations about the effectiveness of specific clinical preventive services for patients without related signs or symptoms (USPSTF add). The USPSTF has numerous guidelines and recommendations for a wide-range of health-related services.

To aid clinicians in treating obesity, the National Heart, Lung, and Blood Institute issued the first obesity-related practice guidelines in 1998.[18] These guidelines recommended that clinicians determine if patients are overweight or obese, advise on weight loss strategies for those interested in losing weight, and motivate those not currently interested to engage in appropriate weight management strategies.[18] In 2003, these guidelines were updated by USPSTF and recommended that clinicians screen all adult patients for obesity and offer intensive counseling and behavioral interventions to promote sustained weight loss for obese adults.[32] This recommendation was graded as a

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B which means that there is high certainty that net benefit was moderate to substantial.[32] The USPSTF found that the most effective interventions combined both nutrition education and diet and exercise counseling along with behavioral strategies to help patients become more confident in their need and ability to change and become more physically active.[32] The task force defines a high intensity program as one that is more than 1 person-to-person (individual or group) session per month for at least the first 3 months of the intervention.[32] A medium intensity intervention is a monthly intervention and anything less frequent is deemed as a low intensity intervention.[32] Following these definitions, the task force found that the most effective interventions were comprehensive and of high intensity (12-26 sessions in a year).[32] However, even with this finding, there are no recommendations made on the intervals of screening due to the lack of evidence of interval times.[18] This USPSTF recommendation was updated again in 2012 and recommended screening all adults for obesity where the clinicians should offer or refer patients with a BMI of 30 kg/m^2 or higher to intensive, multicomponent behavioral interventions.[10] Since 2003, the USPSTF has found adequate evidence that intensive multicomponent behavioral interventions for obese adults can not only improve BMI in obese patients, but also improve glucose tolerance and other physiologic risk factors for CVD.[10] As a result, the most current recommendation only addresses individuals with a BMI of 30 kg/m^2 or higher and does not address the effectiveness, or lack thereof, of screening in overweight adults with BMI of 25 kg/m^2 – 29.9 kg/m, which could be detrimental to assisting those who are overweight and not yet obese.[2]

The USPSTF bases its recommendations based on the evidence of the benefits and harms of the service and as an assessment of the balance between the two.[3]

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Furthermore, it does not consider the cost of providing a service within this assessment.[3] Yet, the USPSTF guidelines stress important themes applicable to obesity management policies and guidelines around the world.[10]

The World Health Organization (WHO) defines health policy as an agreement or consensus on the health issues, goals, and objectives to be addressed, the priorities among those objectives, and the main directions for achieving them.[37] Whereas, integrated public health policies are defined as the combination of policies including an appropriate mixture of interventions that optimizes the functioning of the behavioral system; thus, ensuring that motivation, capability, and opportunity interact in such a way that they promote the preferred (health-promoting) behavior of the target population, and the policies are implemented by the relevant policy sector from different policy domains.[38] Thus, obesity would fall into both the health policy and integrated public health policy domains since the etiology is so complex in nature.

Research has shown that measurable changes in awareness and knowledge are anticipated within 2 years of a policy change or different practice in medicine.[39] Social norms, preferences and food choices take a little longer and are anticipated over 3 years after a change.[39] Yet, the earliest impact for the reduction in the prevalence of overweight or obesity was over 5 years following the change.[39] Thus, the first recommendation made in 1998 would not have seen a difference in prevalence until after 2003 when the recommendation was updated by the USPSTF. Therefore, the 2003 updated recommendations would not have caused a difference in obesity prevalence until after 2008.

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2.2 SIGNIFICANT RESEARCH PUBLISHED ABOUT THE PROBLEM

Physician vs. lay population views on obesity treatment

Greener and colleagues' research found that health professionals and policy makers largely view obesity as a socio-ecologically determined problem, which is explained through social and environmental causes. Health professionals tend to be more focused on individual-oriented weight management interventions as effective responses, whereas policy makers consider environmental and social policy change as the most likely way to reduce obesity.[40] However, policy makers also know it is unlikely that such policies would be implemented without political will and popular support.[40]

The majority of physicians believe the biomedical perspective views of health are principally attributable to biological and psychological problems.[40] This perspective explains that obesity is caused by the deficient behavior of individuals who fail to expend more calories than they consume. As a result, many interventions focus on the individual and are based upon the assumption that once a patient receives the appropriate information about their problem, s/he will be more likely to engage in healthy behaviors. Biomedical obesity interventions aim to enhance the health promoting capability of existing health services to prevent or reduce the occurrence of obesity in patients.[40]

All of this information renders into primary care physician (PCP) beliefs about diet-related causes of obesity translating into actionable nutritional counseling to use with their obese patients.[41] Yet, family practitioners, internists, and endocrinologists reported treating obesity themselves in only about 50% of their obese patients, whereas other groups reported intervening with only 5% to 29% of obese patients, but expressed greater interest in making referrals.[25] Physicians express high concern with management of

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obesity but vary in the interest in assuming this role themselves. Dolor and associates found that physicians agreed that diet and weight counseling requires too much time compared with other intervention efforts such as smoking cessation.[42] They also found that physicians feel less adequately trained to counsel about diet than they do with smoking cessation. Lastly, they found that physicians agree that they think patients find diet, weight, and physical activity topics more embarrassing to discuss than smoking.[42] Thus, physicians do not always attempt to provide diet and weight counseling to their obese patients due to restraints on time, lack of education, and sensitivity of the topic.

The vast majority of physicians believe that obesity is caused by psychological and behavioral factors and are uncertain about the effectiveness of the available solutions to treat it.[43] When compared to the lay population, PCPs show a greater endorsement of behavioral, structural, social, and psychological causes of obesity, and less of the biological model of causality.[43] Thus, physicians either endorse a medical solution if they believe obesity is caused by biological factors or endorse policy change as a solution if they believe it is caused by social factors.[43] Overall, PCPs and other general practitioners believe that obesity does not belong within the medical domain due to the social factors that play into the disease.[43,44]

A study that surveyed patients and physicians revealed that in terms of causes of obesity, patients were more likely to attribute obesity to a gland or hormone problem, slow metabolism, and stress, whereas, physicians were likely to blame obesity on overeating.[43] They also found that in terms of consequences, patients rated difficulty getting to work more highly, whereas, physicians regarded diabetes as a more important consequence of the disease. They found that regarding the solution to obesity, patients

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rated the PCP and a counselor as more helpful, whereas, the physicians rated the obese person themselves more highly. The study further discovered that patients have a self-serving model of obesity by blaming internal uncontrollable factors for causing obesity, yet expecting external factors to solve it. Meanwhile, physicians tend to take on a victim blaming model through attributing both cause and solution to internal controllable factors within the individual. Odgen and colleagues concluded that such differing models have implications regarding the form of intervention likely to be used in primary care and they conclude that patients would prefer a more professional based approach, while PCPs would prefer a more patient-led one. They found that even if an intervention could be negotiated, success rates would be low as either the patient or the PCP would be acting in contradiction to their beliefs about the nature of obesity.[43,44]

Counseling in primary care practice

Ma and colleagues examined the national estimates of counseling practices based on the USPSTF recommendations through analyzing data from the National Ambulatory Medical Care Survey (NAMCS) from 1992-2000. They found that throughout the 1990s, diet counseling was provided in less than 45% and physical activity counseling in less than 30% of visits by adults with obesity.[45] When counseling did occur in the outpatient visit, visits with diet counseling averaged 20.1 minutes; visits with exercise counseling averaged 20.6 minutes, in contrast with an average of 18.3 minutes for visits without counseling.[5] Yet, numerous reports sight the importance of normal physical activity for the prevention of numerous chronic diseases.[46] Results from previous research has shown that physician interventions to discuss physical activity need not take more than 3-5 minutes during an office visit and can play a critical role in patient implementation.[47]

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Thus, time should not be a limiting factor for physicians to discussing these obesity related topics.

Alexander found that despite USPSTF recommendations, physicians address weight loss in less than 20% of their visits and many address weight in a less than optimal way.[48] Another study established that fewer than 50% of physicians reported always providing specific guidance on diet, physical activity, or weight control.[29,49] This same study found that regardless of the patient's disease status, less than 20% of PCPs always referred patients for further evaluation and less than 22% reported always systematically tracking patients over time concerning weight or weight-related behaviors.[29] Ma stated that despite available national guidelines, diet and physical activity counseling remain below expectations during outpatient visits by obese adults. This study aligns with past studies that examine physician practice regarding behavioral counseling and have consistently suggested suboptimal adherence to clinical guidelines.[5,41] However, they positively anticipate that counseling rates will increase over time.

Felix and colleagues later assessed the impact of the USPSTF recommendations by examining the Behavior and Risk Factor Surveillance System (BRFSS) survey from 2000-2005. Less than half of the pre- and post-guideline obese respondents reported receiving weight loss counseling (WLC) from their clinician. Post-guideline reports by obese patients in 11 states were very low (44%), when compared to the 100% WLC recommendations by the USPSTF. They found no significant differences in odds of receiving WLC when comparing pre-guideline and post-guideline data.[18] These findings are counterintuitive since previous research has demonstrated that overweight and obese

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individuals who receive WLC from their clinicians are more likely to engage in weight loss efforts.

Barlow and associates conducted a study that found that a diagnosis code of obesity was assigned to less than 10% of the patients with an obese BMI. Bardia and colleagues found that 19.9% of obese patients had a diagnosis of documented obesity, and of those 19.9%, only 22.6% (approximately 4 patients) had an obesity management plan documented. A 2011 study found that 1/3 of obese adults received an obesity diagnosis and approximately 1/5 received counseling for weight reduction or exercise.[41] That same study found that one of the biggest predictors of weight-related counseling was an obesity diagnosis.[41] These studies reveal that there is a significant gap that exists between physician practice, diagnosis, and optimal management of obesity in clinical practice.[16]

Barriers to counseling in primary care practice

Physicians are faced with many barriers to care in their daily office practice. When dealing specifically with barriers to counseling, they are faced with several barriers including lack of time, inadequate training and education in weight counseling, negative physician attitudes towards obese patients, and pessimism regarding weight loss.[26,50,51–53] Previous research suggests that PCPs feel obliged to counsel about the health risks of obesity and make sure of goal setting and referrals, but may not feel competent to intervene and may tend to 'blame the victim (patient)' for his or her lack of self-control.[25] Furthermore, some physicians find it difficult to recognize when a patient is mildly obese, but appear to recognize the medical significance of moderate to morbidly obese patients; yet, express ambivalence regarding how to approach the issue.[25]

Research shows that differences in patient-physician perception and expectations are believed to pose a significant barrier to effective communication about weight loss and may hinder patient motivation to make health behavior changes.[54,55] Even if the communication begins for counseling, physicians perceive many significant barriers that hinder the discussion. These include some of the following: societal factors such as sedentary nature of work, the role of the family and social groups interference with interventions, scarce resources, low outcome expectations, lack of training to influence weight loss, lack of confidence, lack of reimbursement [until the Affordable Care Act in 2010 that requires all health insurance carriers to cover USPSTF recommended services with no patient deductible or copayment[14], and vague USPSTF guidelines.[26,48,55] Furthermore, there is no consensus as to the provision of diet and physical activity counseling to PCP patients, leaving the decision up to the physician as to what will be discussed and how often.[5] Thus, there is a disconnect between physicians' high level of confidence in medical training and their low expectations that patients will change their behavior.[42]

Even though there are numerous barriers to providing the needed counseling in primary care, Gudzune and colleagues found that patients have a positive perception of their physician and indicate promise for health professionals acting as motivators of behavior change in obese patients.[56] Physicians can use this perception to their advantage when trying to address sensitive topics with their obese patients. Another survey by Dolor and associates, found that patients were very comfortable discussing weight, diet, exercise, and smoking behaviors with their physicians.[42] They also found that patients were confident that they could reduce their weight (36%), compared with increasing their

physical activity (28%). The patients were highly motivated to lose weight (51%), but fewer were motivated to change their diet (28%).[42] Smith and colleagues, along with numerous others, consistently document that physician's recommendations have a strong influence on individual health behaviors, and that physicians are an important source of information on preventive healthcare.[29] Ko reiterates that data suggests healthcare professionals are not taking advantage of their influential role in promoting health behaviors among their obese patient population.[28] Scott further states that PCPs are uniquely positioned to observe the adverse health consequences of these societal trends (obesity) and it is incumbent upon them not only to provide assistance to obese patients in the office, but also to advocate for broader social policies that promote food nutrition and increased physical activity, thus, addressing the root causes of the obesity epidemic.[57] Physicians are faced with many barriers, yet with these positives noted, the physicians are in a position to make a difference for their obese patients if they take the time to do so.

Sex differences in obesity counseling provided by PCPs

Physicians and patients bring their own characteristics, attitudes, belief, expectations, and communication styles to a medical visit. Physician sex has been found to have an impact on the process of medical care and its outcomes.[58] Most notably, the physician's sex leads to differences in the way they communicate and interact with their patients.[58] Female PCPs tend to be more engaged in partnership building, information sharing, discussion of psychosocial topics, and encourage more patient participation in their interaction when compared to their male counterparts.[58–60] Female PCPs also include more focus on the patient's emotional and psychosocial concerns which enhances the patient's level of participation in care.[61] Furthermore, female physicians are more

likely to see female patients, have longer visit durations, were most likely to perform preventive services and make follow-up arrangements and referrals, and had more talk during the visit in general.[59,60] One study found that patients of female physicians have been found to talk 58% more than patients of male physicians and to be more satisfied in their care overall.[60] Yet, another other studies have found that there is no difference in satisfaction of patients between physician sex.[54,62] Male PCPs tend to spend more time doing technical practice behaviors with their patients (medical history note taking) when compared to females.[63] These differences in physician behavior could result in differences seen in providing counseling to their obese patients.

Patient sex has also been found to translate into different experiences during medical care encounters. Specifically, female patients tend to ask more questions, get more information, receive more counseling and preventive services, and have more participatory visits when compared to male patients.[58,62,63] Female patients also have more emotionally charged talk and portray more interested with their voice quality than men.[62] Female patients have an overall lower health status, more likely to receive an obesity diagnosis, make more medical visits, and have higher total annual health spending when compared to their male counterparts.[41,58,59] Several studies revealed a favoring of female patients in receiving more total and comprehensive health services, more preventive services, more information, and more total communication over men during visits.[58,60] In a study of women and their desired counseling from a PCP found that white and African American women desire the same type of counseling and interaction from their physicians.[64,65] Thus, women overall seem to have the same preference in counseling and interaction with their physician; whereas, men have different

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expectations. Several differences have been found between overweight and obese women and men, where men receive less advice for weight-loss.[54] As previously stated, women are more likely to make medical visits; therefore, men may be a greater risk of not addressing their weight-related concerns and less likely to receive an obesity diagnosis.[16,54] Since there are differences between the way that male and female patients are treated, health provider's behavior may be based on gender-related considerations and stereotypes.[58] Medical care can be described as a social process and not very different from other arenas of interpersonal relationships; yet, patient gender effects on physician behavior has been fewer, weaker, and less consistent over time.[62]

Age differences in obesity counseling provided by PCPs

The relationship between age and receiving weight loss counseling is unclear. Currently, 68% of US adults are overweight or obese, 32% of school-aged children and adolescents are at or above the 85 percentile of BMI for age.[66,67] An overweight school-aged child is 30% more likely to become an obese adult, and increases to 80% for an overweight adolescent.[68] While the relationship is unclear between age and obesity counseling, there are some themes that have emerged throughout research that reveal some trends in regards to age and health education counseling. Older patients (65+) and young adults (18-29) are significantly less likely to have an obesity diagnosis recorded in their medical record by their PCP.[16,41,49]

One study found that increasing age is related to receiving more advice until the age of 55-65.[51] Along with another study that found patients aged 18-49 were more likely to have primary prevention efforts from their PCP in regards to weight management.[69] After ages 55-65 the inverse relationship applies; thus, middle aged patients have been

found to have the highest obesity-related counseling rates of all ages.[51] Between 1991 and 2000, the obesity rates in people aged 60-69 has increased 56% and for people aged 70 and higher increased 36%.[70] The baby boomer generation is aging and as a result the Medicare and Medicaid obesity-related costs are likely to grow substantially due to their large numbers and higher rates of obesity when compared to previous generations.[23] Therefore, it is important to study and understand the current differences in counseling due to age. One large reason is because obesity can exacerbate the age-related decline in physical function in patients over the age of 65 and lead to increased frailty.[70] Many studies have shown that weight-loss counseling and therapy can improve physical function, quality of life, glucose tolerance, reduced incidence of diabetes, and medical complications associated with obesity in adults over the age of 65.[70,71]

Weight differences in obesity counseling provided by PCPs

Overweight and obese patients have reported that they receive different types of weight-loss advice during medical visits depending on the severity of their obesity status. Overweight men have reported deficits in their care relative to average weight men.[72] Whereas, overweight women have reported enhanced care relative to average weight women.[72] This same trend of treatment discrepancies were seen in another study where overweight and obese men reported receiving less advice than obese women.[54] One study found that physicians are more likely to encourage women who have a BMI of 25 kg/m^2 or greater to lose weight and suggest more treatment referrals than men with the similar BMI.[72] However, men with a BMI of 32 kg/m^2 or greater were more likely to be encouraged to lose weight and have treatment referrals than women with the similar BMI.[72] Overall, studies have found that physicians are more likely to provide weight-loss

counseling and treatment referrals for patient with higher and more morbid BMIs.[72] Increasing BMI, specifically with severely obese individuals, has been consistently related to weight-related counseling and a strong predictor of formulation of an obesity plan.[16,51,72–74] In a study looking at obese pregnant women, the results revealed that overweight and obese pregnant women were significantly less likely to receive diet/nutrition counseling as were overweight or obese non-pregnant women.[75] This study further portrays that physician behavior and patient characteristics play an important role in whether health education counseling occurs during a visit. Dutton found that patients BMI and physicians sex is most consistently associated with physician practice of providing weight-loss counseling to their patients.[76]

Physician's behavior in providing health education counseling can be influenced by patient factors including age, level of motivation, medical morbidity, and BMI.[72] Research shows that many physicians have negative attitudes and discriminatory intentions towards their patients who are more obese.[72] This stems from physician behavior and beliefs that overweight individuals are responsible for their condition and attribute their lack of weight loss to a lack of self-control and lack of cooperation.[72] While these feelings occur, physicians do not feel that their attitudes and beliefs translate into action; yet, studies demonstrate that attitudes and intentions often predict behavior.[72] This alone makes it important to further understand the relationships between physician behavior in providing counseling and patient characteristics that influence their behavior.

Type of physician and differences in practice of obesity counseling

Different types of physicians have been found to provide more health education counseling when compared to other types. PCPs are 2.38 times more likely to provide

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weight-loss management when compared to non-PCP physicians.[74] Specialist have reported high concern for the health risks related to overweight and obese patients, but are not as likely to provide counseling to those patients.[25] Family practitioners, internists, and endocrinologists report treating their patients for obesity themselves in about 50% of their obese patient population.[25] While other groups reported treating their patients for obesity in about 5% to 29% of their obese patient population.[25]

Electronic Health Record Implementation counseling differences by PCPs

Electronic Medical Records (EMRs) provide a new way that physicians can use technology to assist during patient visits. One common way to use the EMRs is to assist in reminders for counseling during the visit.[77] Several studies have looked to see if automated prompts for counseling would lead to greater weight loss or a greater amount of counseling to occur during visits.[78,79] The results found that automated clinical reminders did not alone cause weight loss to occur in overweight and obese patients; however, if the physician diagnosed the patient with obesity during the visit, the weight loss was greater overall.[78] While other studies have looked at the use of EMRs and automatic calculations of BMI in relation to how often counseling occurs.[80,81,82] The results found that the documentation increased for severely obese individuals but not in others.[80] This was thought to be due to the physician's behavior of only checking the BMI of the patient when they were noticeable obese.[80] Numerous studies show that with EMRs implementation in the practice with a weight-related mechanism built in, results in higher referral rates for patients when compared with those without.[81,82] A more sophisticated study looked at documentation of diagnosis of obesity with EMRs that included an alert for overweight patients, a counseling template, an order set to facilitate

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entry of diagnosis, an import template for notes, and enabling ordering of specific handouts for patients.[83] With all of these mechanisms working within the EMR, the control group had increased documentation and short-term behavior change as a result.[83] While EMRs are a great start and show improvement in documentation and referrals of obese patients, there are still fallbacks within primary care practices and others. The American Recovery and Reinvestment Act of 2009 has money targeted to assist physicians, hospitals, and other health care settings in adopting EMRs. Yet, EMRs are most often used in a way that does not maximize their potential to improve care at the point of service or the quality of care overall.[84]

Other factors that influence the likelihood of providing obesity counseling

There are some other factors that have been linked to the likelihood of a physician to provide health education counseling regarding obesity. Physician's BMI has been shown to play a role in the likelihood of that physician to provide obesity counseling to their patients.[85] The most common trend is that normal weight physicians with normal BMI ranges are more likely to engage their patients in weight loss discussion and counseling as compared to overweight and obese physicians.[85] This has been related to the increased confidence in normal weight physicians and the belief that patients would trust their advice more if their BMI was within the normal range.[85] However, regardless of the physicians BMI, most physicians feel responsible to provide weight related care to their patients but have concerns in their effectiveness and lack of effective strategies to do so.[86] Furthermore, one study showed that physicians overestimate the amount of weight-related discussions that they actually have with their patients.[87] Physicians feel that they discuss weight loss topics more often with their patients than what recorded visits reflect

which could be why the counseling rates are inconsistent in all obese patients. Thus, reiterating the point that patients and physicians have different views and expectations and may not have the most effective communication during office visits.

Intersection of perception and implementation of USPSTF recommendations

Unfortunately, there is a divide in the perception of obesity by the lay population and medical professionals, specifically physicians. Throughout all of the research mentioned previously, the results suggest that USPSTF obesity-related guidelines have not had an impact on obesity prevalence or physician WLC behaviors.[18] However, Macdiarmid and colleagues developed a timeline to estimate the 'time to impact' for policy-related interventions in health.[39] Following their research, they found that measurable changes in awareness and knowledge were anticipated within 2 years, while for social norms and preferences, the anticipated time was 3 years.[39] Furthermore, they established that the earliest time to impact for a reduction in the prevalence of overweight or obesity was greater than 5 years.[39] Thus, with data currently available up until 2010, it is unknown whether the rates of PCP counseling (USPSTF recommended counseling) have increased since previous studies were published and whether it has had an impact on the prevalence of obesity.

CHAPTER 3 METHODOLOGY

3.1 INSTRUMENTATION AND DATA COLLECTION

Data for this study were obtained from the National Ambulatory Medical Care Survey (NAMCS) and were pooled between 2008 and 2010. NAMCS is a national survey designed to meet the need for objective, reliable information about the provision and use of ambulatory medical care services in the US. The validity of this survey has been documented with good concordance shown between survey results and direct observations in physician practices.[88] Findings from the survey are based on a sample of visits to non-federal employed office based physicians who are primarily engaged in direct patient care. Physician specialties excluded from participating in the survey are anesthesiology, pathology, and radiology. The survey has been conducted annually since 1989.[89]

Specially trained interviewers visit the physicians prior to their participation in the survey to provide them with the survey materials and instruct them on how to complete the forms. The data are collected by the physician, not the patient, to provide an analytic base that expands information on ambulatory care collected through other NCHS surveys. Each physician selected is randomly assigned to a one-week reporting period. During the reporting period, data for a systematic random sample of visits are recorded by the physician or office staff on an encounter form that is provided.[89]

NAMCS utilizes a multistage probability design that involves probability samples of primary sampling units (PSUs), physician practices within PSUs, and patient visits

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within practices. The procedure produces essentially unbiased national estimates. The first-stage sample includes 112 PSUs which are geographic segments composed of counties, groups of counties, county equivalents or towns and townships within the 50 state and the District of Columbia. The second-stage stratifies physicians by 15 groups. The third and final stage divides the physician sample into 52 random subsamples or equal size, and each subsample is randomly assigned to 1 of 52 weeks in the survey year. Lastly, a systematic random sample of visits is selected by the physician during the reporting week. The sampling rate varies from 100% sample for small practices, to 20% for large practices.[89]

The unit of analysis for the survey is the physician-patient encounter or visit. For each patient visit, a standard encounter form is completed by the physician with staff assistance when possible. The encounter form contains information on patients' symptoms, patient demographics (e.g., age, race, ethnicity), visit characteristics (e.g., general exam, duration of visit), physician characteristics (e.g., specialty, region of the country), physician diagnoses, diagnostic information (e.g., *International Classification of Disease, Ninth Revisions, Clinical Modification* (ICD-9-CM) codes and reasons for visit), medication orders, preventive counseling, patient management, and planned future treatments. Item nonresponse rates are generally 5% or less in the survey, with few exceptions. Keying and coding error rates generally range between 0-1% for various survey items. The NAMCS encounter forms are revised every 2 years. Thus, specific variables are not always available for the entire study span.[89]

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3.2 RESEARCH DESIGN

This is a pooled cross-sectional study of a secondary dataset (NAMCS) from 2008-2010. There was no control group and no intervention implemented within the study. Instead, those physicians that were selected for participation formed a sample of surveys that were reviewed. There were no ethical concerns regarding the design of the study since the dataset is de-identified. The study sample sizes for each year are presented in Table 3.1. The pooled data between 2008 and 2010 had a total sample size of 92,251; however, after exclusions were introduced the population dropped to 11,041 (Table 3.1). There were two large exclusions within this study. The first exclusion was based on the patient's reported BMI level during the visit. If the patient had a BMI of less than 30

3.3 DEPENDENT VARIABLE

Dependent variables under investigation are the reported provision of diet/nutrition health education counseling, exercise health education counseling, weight reduction health education counseling, and diagnosis of obesity as indicated by check boxes on the NAMCS encounter forms (yes – checked or no-unchecked). All forms of counseling were assessed during the study period of 2008 to 2010.

3.4 INDEPENDENT VARIABLE

Independent variables for the patient characteristics were determined using the Andersen model of healthcare utilization and the physician-induced demand model (Table 3.2). The Andersen model suggests that health behaviors are a result of several individual and contextual factors. These individual factors are broken out into predisposing, enabling and need factors (Figure 3.1)[90,91].

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Table 3.1: Sample Size

Year	Total NAMCS Sample	Study Sub-sample
2008	28,741	3,307
2009	32,281	4,392
2010	31,229	3,342
Total	92,251	11,041

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Table 3.2 Independent and Dependent Variables

| Independent Variables	Dependent Variables
Patient Characteristics	
Predisposing	Diet/nutrition health education counseling
Age	Exercise health education counseling
Gender	Weight reduction health education counseling
Race	
Enabling	
Expected type of payment	
Time spent with physician	
Obesity check box	
Urban/Rural	
Need	
Type of office visit scheduled	
BMI	
Physician Characteristics	
Provider Type	
Practice Ownership	
EMR Implementation	
EMR Reminder Status	
Physician Specialty	

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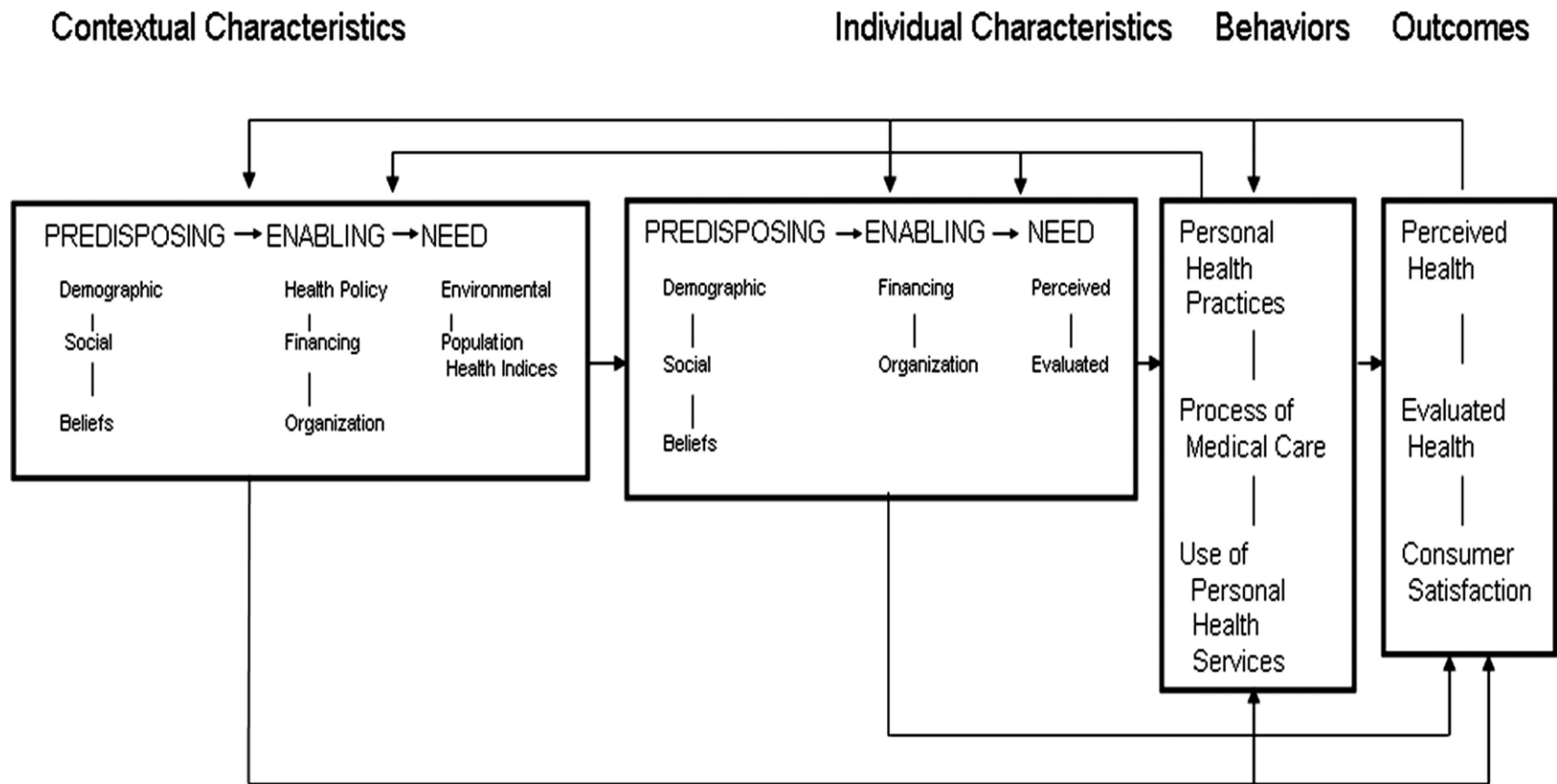
Figure 3.1: The Andersen Model of Healthcare Utilization & Health Outcomes.[90]

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Predisposing variables examined included age in years (18-44, 45-64, and 65+), gender (male and female), and race (white, non-white, and missing). Enabling factors included the expected type of payment from the patient (private pay yes or no; government pay yes or no; and other pay yes or no), the time spent with the physician in minutes (0-10, 11-20, 21-30, and 30+) and whether the BMI box was checked on their survey form (yes – checked and no-unchecked). Need was assessed through the type of visit that was scheduled by the patient (new problem, chronic problem-routine, chronic problem-flare-up, pre/post-surgery, and preventive) and a BMI calculation (class I: 30.0-34.9, class II: 35.0-39.9, and class III: 40+) of the patient's height and weight to determine BMI level and need for counseling and the type of visit that was scheduled.

Independent variables for the provider characteristics were determined from the supplier (physician) induced demand model. In economics, demand curves are defined as stable.[92] However, they can be shifted outward by an outside force (such as a physician). The physician induced demand model reflects the idea that information between physicians and patients is asymmetric and a physician can shift the demand curve for their services when it is in the physician's self-interest to do so (Figure 3.2).[92,93] This shifting would involve a physician recommending care, such as a revisit, whether it is beneficial to the patient or not.[92,93] In this case, the recommended care would benefit the patient since it could potentially increase their health through the health education counseling visits and revisits.[92,93] The variables examined in regards to the provider characteristics from the physician induced demand model are the provider type (MD and DO), the practice ownership (physician or physician group, HMO, community health center, and other), provider specialty (family practice and other), EMR implementation
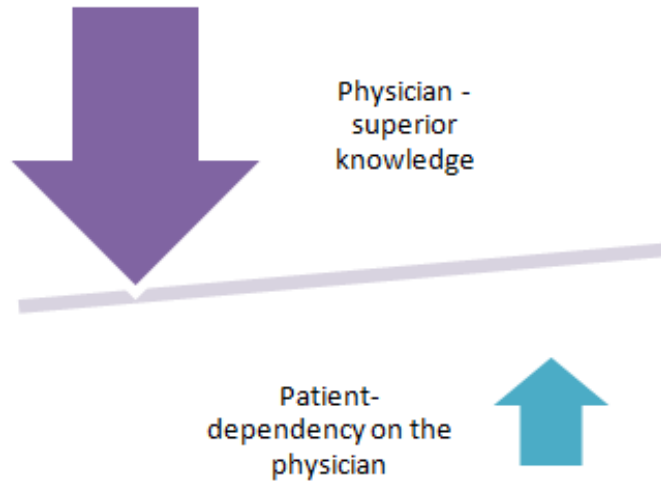
Figure 3.2: The concept of physician induced demand (Sloan and Folland).

within the practice (yes – all electronic, yes – part paper/part electronic, no, and unknown) and EMR clinical reminder status (yes-reminders turned on and no-reminders turned off).

3.5 STUDY CONCEPTUAL MODEL

A study conceptual model was developed to describe how the dependent and independent variables are related to each other within this study (Figure 3.3). The base of the model was developed from Andersen's model, discussed previously, where there are predisposing (blue variables), enabling (green variables) and need (orange variables) factors association with health care delivery (listed down the side of Figure 3.3). The variables that fall into each of these categories can be classified as provider characteristics, patient characteristics, behaviors, or outcomes (listed across the top). The other model used was the physician induced demand model that is included with variables under provider characteristics and behaviors. While the outcomes of this study are the types of health education counseling, they are classified as health behaviors that make them intermediate outcomes within the model. The final outcomes of the model will not be observed within this study.

3.6 PATIENT CRITERIA AND EXCLUSIONS

The BMI categories of underweight, normal weight, overweight, and obese were used for this study from the established categories by the Centers for Disease Control and Prevention (CDC) (Table 3.2). For the purposes of this study, only the obese category (BMI of 30.0 kg/m^2 and above) of patients was analyzed because the USPSTF recommendations are only for those individuals with a BMI of 30.0 kg/m^2 and above.
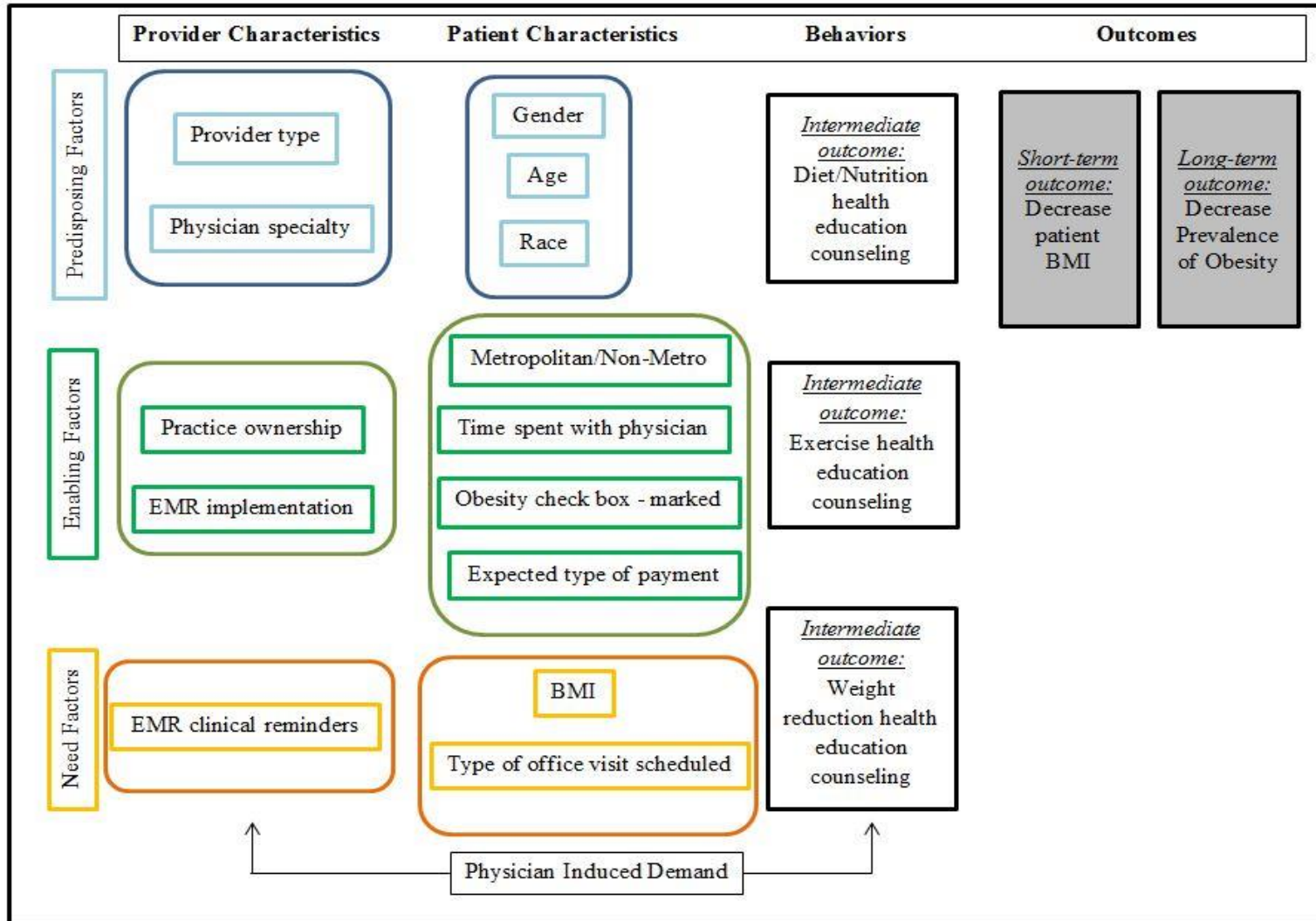
Figure 3.3 Study Conceptual Model

Once the obese category was identified, it was further broken down into obesity classes (Obesity Class I: 30.0 kg/m^2 -34.9 kg/m^2, Obesity Class II: 35.0 kg/m^2 -39.9 kg/m^2, and Obesity Class III: 40 kg/m^2 and above). The class I obesity group was used as the referent level in analysis since it is the lowest class of obesity. The Age categories of 18-24, 25-44, 45-64, and 65 and above were going to be used for this study from the established breakdown of age groups within the U.S. Census Bureau. However, after the univariate analysis was completed, the 18-24 and 25-44 groups were combined to provide a large enough sample for further anlysis. Those individuals below the age of 18 will be excluded from this study to include only the adult population for which the USPSTF recommendations are written.

Gender was broken into male and female, where the male group was used as the referent level. The race variable was initially broken into white, black/African American, Asian, Native Hawaiian or other Pacific Islander, American Indian, and more than one race. Following the univariate analysis, the categories of white, non-white and missing were used to ensure a large enough population for further analysis. Non-white describes all of the race categories except the whites. The missing category was included for analysis because it had over 2,000 patient visits with missing race that would have been excluded from the multivariate analysis if it was not kept. The white category was used as the referent level in analysis.

The expected type of payment variable was initially broken into private, Medicare, Medicaid, workers compensation, self-pay, no charge, and other. However, the univariate analysis results led to combining different groups to make a large enough population for further analysis. Therefore, the private pay variable remained the same, the Medicare,

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Table 3.3: Patient Characteristic Variables and Categories

Variable	Variable Subcategories
Age (Years)	18-44* 45-64 65+ Excluded: <18 years of age
Gender	Male* Female
Race	White* Non-White Missing

Expected type of payment	Private Pay
	   Yes*
	   No
	Government Pay
	   Yes*
	   No
	Other Pay
	   Yes*
	   No

Time spent with physician (Minutes)	0-10 11-20* 21-30 30+
Obesity check box	Yes, Checked* No, Unchecked
Urban/Rural	Urban* Rural
Type of office visit scheduled	New Problem Chronic Problem, routine Chronic Problem, flare-up Pre-Post Surgery Preventive Care*
BMI	Class I: 30.0-34.9 kg/m^2* Class II: 35.0-39.9 kg/m^2 Class III:40+ kg/m^2 Excluded: <30 kg/m^2
*Denotes referent level	

Medicaid, and workers compensation variables were combined to make the government pay variable, and the self-pay, no charge, and other were combined to make the other pay variable, each with a yes or no response. The yes response was used as the referent level within each of the payment variables. The time spent with the physician variable describes the amount of time that the patient spent with the physician during the visit. The survey reports the time in 1 minute increments up to 59 minutes and then has '1 hour' and '1 hour and' categories for each hour up to 4. The initial plan to was change this variable from continuous to categorical by dividing up the time spent with physician into the subcategories of 10 minute intervals until 1 hour and then have hour long intervals up to the '4 hours and' category from the survey. However, once the univariate analysis was completed, it was apparent that subcategories needed to be combined so that there was enough sample within each variable to run further analysis. Therefore, the end result was 0-10 minutes, 11-20 minutes, 21-30 minutes, and 30 minutes and above. The 11-20 minute subcategory was used as the referent level since the average time scheduled with a physician is 15 minutes.

The encounter form has a section that says, "regardless of the diagnosis written for the patient, does the patient now have – mark all that apply." Within this section there is a check box for obesity. Thus, this variable has the subcategories of yes, the box was checked or no, the box was unchecked. The yes-boxed checked subcategory was used as the referent level, since we know all of the visits in the study had obese patient encounters due to the BMI exclusions. The type of office visit variable describes the documented reason for the visit based on the physician's understanding of the patient's problems. The reason for visit variable was broken into 5 subcategories including new

problem (which is less than 3 months onset), chronic problem (routine), chronic problem (flare-up), pre/post-surgery and preventive care. The preventive care subcategory was used as the referent level in analysis since that is the type of visit that health education counseling would most likely occur within. Lastly, the urban/rural variable describes the type of location that the visit took place within. The initial plan to was divide the variable into the subcategories of large central metro, large fringe metro, medium metro, micropolitan, and small metro like the survey had it broken down. However, this variable had 4 subcategories that all reflected an urban classification and 1 that reflected a rural. Therefore, large central metro, large fringe metro, medium metro, and small metro to make the urban subcategory and micropolitan was left as is to make the rural subcategory for distinction between the two. Thus, the end result was 2 subcategories of urban and rural. Urban was used as the referent level for analysis.

3.7 PHYSICIAN CRITERIA AND EXCLUSIONS

The type of practice ownership subcategories from the survey included physician or physician group, HMO, community health center, medical/academic health center, other hospital, other health care corporation, and other. (Table 3.3). However, following the univariate analysis, some subcategories needed to be combined to allow for a large enough sample and less complicated results. Thus, the physician and physician group, HMO, and community health center subcategories remained as they were and the medical/academic health center, other hospital, other health care corporation, and other were all combined to form the other subcategory. The physician or physician group ownership was used as the referent level for analysis. The provider type variable describes the training and degree of the physician providing the visit.

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Table 3.4: Provider Characteristic Variables and Categories

Variable	Variable Subcategories
Provider Type	MD* DO
Practice Ownership	Physician or Physician Group* HMO Community Health Center Other
EMR Implementation	Yes, all electronic* Yes, part paper, part electronic No Unknown
EMR Reminder Status	Yes* No
Physician Specialty	Family Practice* Other
*Denotes referent level	

The provider type variable was broken into two subcategories including medical doctor (MD) and doctor of osteopathy (DO) which is the same as the survey breakdown of the variable. The physician specialty describes the specialty that the physician is certified to practice within during the time of the visit recorded.

The physician specialty variable was initial broken into several categories. However, for the purposes of this project, I was only interested in family practice compared to other. Thus, the 2 subcategories include family practice specialty which includes general/family practice, internal medicine, and OBGYN, and other includes all other specialties within the survey which included cardiovascular, dermatology, general surgery, neurology, oncology, ophthalmology, orthopedic surgery, pediatrics, psychiatry, urology, and other specialties. Family practice was used as the referent level since it was the specialty of interest in regards to the USPSTF recommendations. The EMR implementation variable describes the current EMR status of the practice in which the visit is taking place. The EMR Implementation variable was broken into 4 subcategories including yes, all electronic, yes, part electronic and part paper, no, and unknown which is the same as the survey breakdown of the variable. The yes, all electronic subcategory was used as the referent level for analysis. Lastly, the EMR reminder status variable describes whether the practice is utilizing the EMR's ability to remind the physicians to provide certain types of treatment to patients based on their history and background provided in the medical record. The EMR reminder status variable was broken into 2 subcategories including yes, turned on and no or turned off which combined the groups of turned off and unknown. The yes subcategory was used as the referent level since the

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physician would be most likely to provide counseling if the reminders were turned on as opposed to turned off.

3.8 DATA ANALYSIS

Statistical analyses were performed using SAS version 9.4 for Windows software x64 systems. In NAMCS, each visit record is assigned a visit weight that accounts for unequal selection probabilities resulting from the sample design and nonresponse. All analyses took into account visit weights, which are available for the entire study span (2008-2010).

Research question one (determining the variations in the three types of counseling: diet/nutrition health education counseling, exercise health education counseling, and weight reduction health education counseling with (a) yes or (b) no) was addressed by using chi-square tests and comparing the proportions across the three types of counseling and the respective combinations, together and individually, to see what variations occur. Research question two (determining what patient and provider characteristics influence the likelihood of providing counseling during a primary care visit) was addressed by using chi-square tests and calculating the odds ratios for the different patient and physician characteristics. Since each physician in the study will see multiple patients, a nominal logistic regression model will be used with other covariates.

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CHAPTER 4 MANUSCRIPT I

4.1 PATIENT CHARACTERISTICS INFLUENCING PRIMARY CARE OBESITY COUNSELING PRACTICES [1]

Abstract

Background: The United States Preventive Services Task Force (USPSTF) recommends three types of health education counseling for use in primary care practices for obese adults patients (BMI > 30 kg/m^2). While these recommendations are well known, a low percentage of physicians provide this counseling to their patients. The objective of this study was to investigate patient characteristics that influence counseling practices of primary care physicians. **Methods:** We analyzed cross-sectional data that was aggregated from 2008-2010 from the National Ambulatory Medical Care Survey (NAMCS). The three types of health education counseling were the dependent variables, while patient characteristics were the independent variables along with provider characteristics as control variables. **Results:** The odds are increased for the patient to receive all types of health education counseling when: their obesity check box is checked versus unchecked (odds ratio [95%CI]: 0.33 [0.27-0.41] for diet/nutrition; 0.42 [0.33-0.54] for exercise; 0.19 [0.15-0.25] for weight reduction); when they are being seen for a preventive visit versus a new problem visit (odds ratio [95%CI]: 0.42 [0.31-0.56] for diet/nutrition; 0.49 [0.36-0.67] for exercise; 0.46 [0.33-0.65] for weight reduction); when they are being seen for a preventive care visit versus a pre/post-surgery visit (odds ratio [95%CI]: 0.28 [0.17-

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0.46] for diet/nutrition; 0.46 [0.28-0.76] for exercise; 0.30 [0.16-0.56] for weight reduction); when they are categorized as having Class III obesity versus Class I obesity (odds ratio [95%CI]: 1.38 [1.15-1.67] for diet/nutrition; 1.39 [1.11-1.74] for exercise; 1.59 [1.21-2.09] for weight reduction); and when they are designated as urban versus rural (odds ratio [95%CI]: 0.57 [0.39-0.85] for diet/nutrition; 0.65 [0.43-0.99] for exercise; 0.63 [0.44-0.92] for weight reduction) while controlling for all other variables.

Conclusion: Although physicians see a vast amount of adult obese patients within primary care practice, health education counseling practices by primary care physicians remains less than optimal. Therefore, there is a drastic need to improve this type of health education counseling by primary care physicians in order to address the current obesity epidemic in the U.S.

Introduction

The United States Preventive Services Task Force (USPSTF) recommends the screening of all patients for obesity.[18] If the patient has a Body Mass Index (BMI) of 30 kg/m^2 or higher, it is recommended to provide or refer the patient to intensive, multicomponent behavioral intervention including three types of health education counseling – diet/nutrition, exercise, and weight reduction.[18] While these recommendations are well known, a low percentage of physicians provide this counseling to their patients.[5,16,29,94] While it is known that primary care physician do not tend to provide the recommended counseling, there is little consensus on what patient characteristics influence the likelihood of counseling to occur during a primary care visit.

Eighty percent of Americans cite their physician as their primary source of information about health, with the average adult making 2.7 visits to a physician per

year.[5] Hence, clinicians, specifically physicians, represent a credible source of health information for their patients, who may be receptive to information about their health during office visits.[5] Yet, a 2005 national study illustrated a trend of decreasing prevalence of weight loss advice to obese patients and another showing primary care physician assessment and behavioral management of overweight and obesity in adults at a low level relative to the magnitude of the problem.[28,29] Moreover, rates of weight loss counseling in primary care have significantly declined despite increased rates of overweight and obesity in the US.[14] In light of the US' obesity epidemic and associated preventable morbidity and mortality, economic burden, and emotional distress, there needs to be a consistent, wide-spread practice of health education counseling among primary care physicians and their obese patients.

The main objective of this study was to investigate patient characteristics that may influence the likelihood of primary care physicians to provide obesity health education counseling to adult, obese patient visits aggregated from 2008 through 2010. These characteristics have been examined previously; however, they have not been examined since 2008 and with obesity being in the forefront of health and wellness more so now than before, it is expected that counseling trends based on patient characteristics have changed since 2008. It is expected that women, middle aged adults, and those with higher BMI classifications will be more likely to receive counseling overall.

Study Conceptual Model

A study conceptual model was developed to describe how the dependent and independent variables are related to each other **(Figure 4.1)**. One base of the model was developed from Andersen's model,[90,91] where there are predisposing (blue variables),
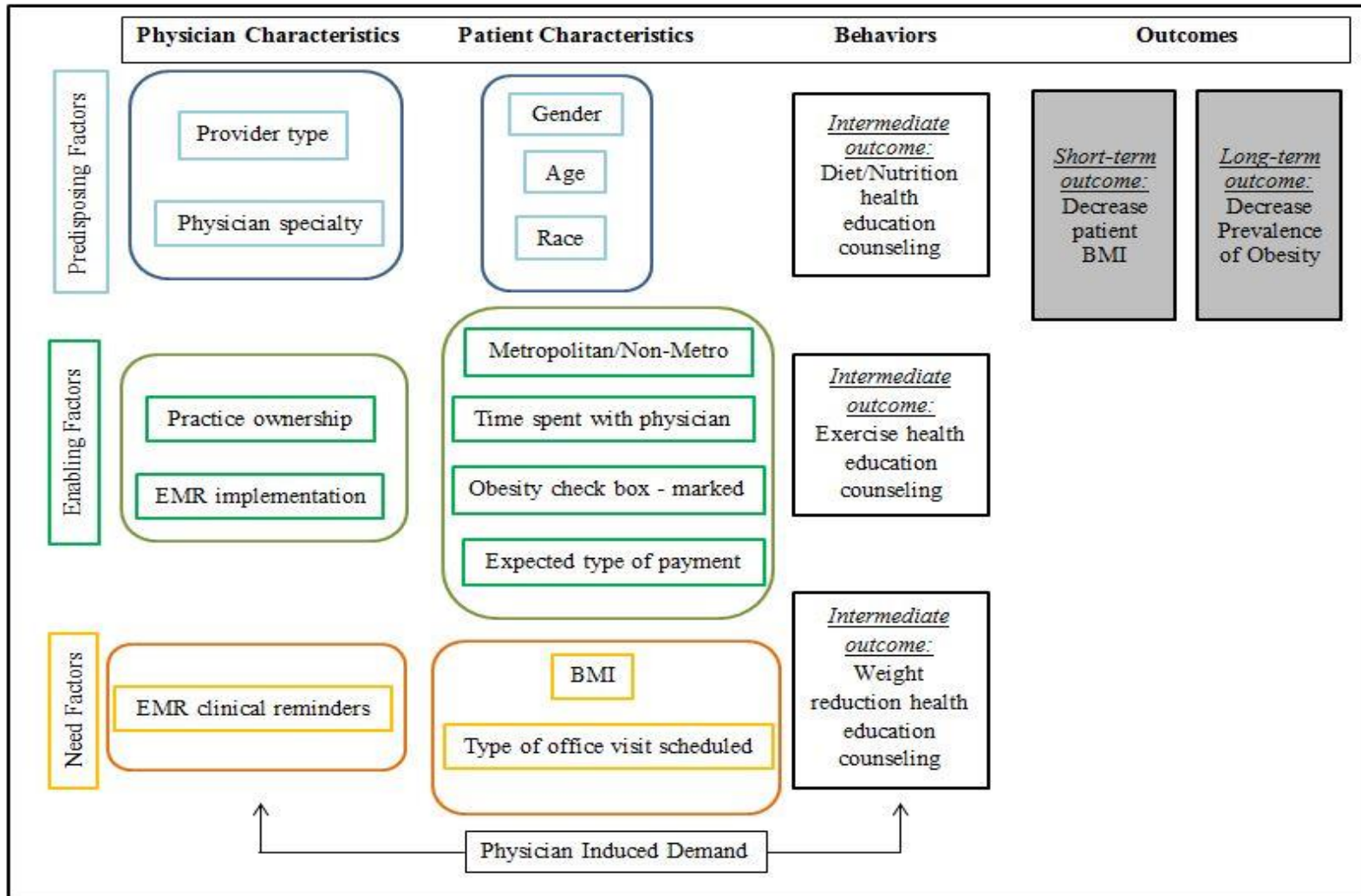
Figure 4.1 Study Conceptual Model – Patient Characteristics

enabling (green variables) and need (orange variables) factors association with health care delivery (listed down the side of Figure 4.1). The variables that fall into each of these categories can be classified as physician characteristics, patient characteristics, behaviors, or outcomes (listed across the top). The other model incorporated was the physician induced demand model that is included with control variables under physician characteristics and behaviors.[92,93] While the outcomes of this study are the types of health education counseling, they are classified as health behaviors that make them intermediate outcomes within the model.

Materials and Methods

Data from this study were obtained from the National Ambulatory Medical Care Survey (NAMCS), which has been proven to be an accurate tool of assessing primary care visit related topics in research.[88] This is a cross-sectional study with data aggregated from 2008 to 2010. NAMCS is a survey conducted by the National Center for Health Statistics (NCHS), which utilizes multistage probability sampling procedures that allow unbiased national estimates to be made from the data. The unit of analysis for this survey is the patient visit. The beginning sample size, including all patient visits, from 2008-2010 was 92,251. This sample size was reduced to 11,041 after all patient visits with a BMI of less than 30 kg/m^2 were excluded from the study. These visits were excluded because the USPSTF recommendations are for those patients with a BMI of over 30 kg/m^2. The physician, with staff assistance, fills out a standard encounter form for the selected patient visits. This form includes information on patient demographics, comorbidities, medications, reason for visit, visit procedures and characteristics,

physician characteristics, practice information, diagnostic information, and other medical services provided during the time of the visit.

Dependent variables

The dependent variables under investigation are the 3 types of health education counseling – diet/nutrition, exercise, and weight reduction – as indicated by a check box on the encounter form indicated by a yes the box was checked or a no the box was not checked. All 3 types of counseling were assessed for each year within the study, allowing for a 3 year aggregated analysis to take place. These variables are collected by physicians indicating, with a check mark, that they provided the counseling to their patients on the NAMCS encounter form. NAMCS instructs physicians to keep daily listing of all patient visits during the assigned reporting week they were given using an arrival log, optional worksheet, or a similar method.[89] Visits are then selected from the list the physician provides using a random start date and a predetermined sampling interval based on the physician's estimated visits for the week and the number of days the physician was expected to see patients that week.[89] Completeness checks are made by field staff and clerical edits are made upon receipt of the data for central processing where detailed instructions are provided to manually review the forms, reclassify or recode any ambiguous entries, and computer edits are made for code ranges and inconsistencies.[89] NAMCS performs a postratio adjustment within each of the physician specialty groups where multiplication factor with the numerator as the number of physicians in the universe in each specialty group and the denominator as the estimated number of physicians in that particular specialty group.[89] In addition, each year there are some physicians who have final visit weights that are large in comparison to those for the rest

of the sample. Thus, NAMCS uses a technique called weight smoothing to preserve the total estimated visit count within each specialty by shifting the excess from visits with the largest weights to those with smaller weights.[89] Those with extremely large visit weights were truncated, and a ratio adjustment similar to that described above was performed.[89] NAMCS documentation states that variables with a sample count (N) of less than 30 or a standard error (SE) of 30% or less are considered unstable and should not be used to describe the population at large because they are considered unreliable.[89] These unstable estimates are flagged within each of the tables presented in this paper to indicate their unreliable nature. Thus, even if it is indicated as significant, it will not be discussed within the results since they are unreliable.

Independent variables

Patient characteristics

Patient characteristics consist of gender (male and female), age (16-44, 45-64, and 65+ years), race (white and non-white), expected type of payment (private pay, government pay, and other pay), BMI (Obesity Class I, Class II, and Class III), time spent with physician (0-10, 11-20, 21-30, and 30+ minutes), obesity check box (yes or no), reason for visit (new problem, chronic problem-routine, chronic problem-flare-up, pre/post-surgery, and preventive care), and geographic location (urban and rural). The variable subcategories were selected after performing a univariate analysis and determining that some groups needed to be combined to have a large enough sample to run further analysis. The referent level used for each variable is the first subcategory listed with the exception of time spent with the physician and the reason for visit. The referent level for the time spent with the physician was 11-20 minutes since the average

patient visit is 15 minutes in length. The referent level used for the reason for visit was the preventive care visit since this would be the type of visit that counseling would most likely occur within. Patient visits were excluded if the patient was less than 18 years of age and/or had a BMI less than 30 kg/m^2. These characteristics were chosen based on Andersen's model that includes predisposing (gender, age, and race), enabling (expected type of payment, time spent with physician, and obesity check box indication), and need (type of office visit and BMI) domains in regards to obtaining health services.[90] Provider characteristics are included in the tables as control variables, but will not be discussed in this paper.

Statistical methods

Statistical analyses were performed using SAS version 9.4. In NAMCS, each visit record is assigned a visit weight that accounts for unequal selection probabilities resulting from the sample design and nonresponse. All analyses took into account visit weights, which are available for the entire study span (2008-2010).

To determine the variations in the three types of health education counseling we compared the percentages from a univariate analysis and percentages with weighted frequencies from a bivariate chi-square analysis across the three types of individual counseling and all possible combinations. Furthermore, to determine the types of health education counseling that were provided based on different patient characteristics we compared the adjusted model percentages from a bivariate chi-square analysis across the three types of counseling individually, as well as when no counseling occurs. Lastly, to determine the odds of receiving health education counseling for the different patient characteristics, multiple logistic regression models were used to report the odds ratio and

95% confidence intervals for each type of counseling individually. Three different models were used for the regressions, one for each type of counseling that could be provided during the visit. These were full models that included the patient characteristics along with the provider control variables.

Results

The majority of the sample was female (61%), between the ages of 45-64 (45%), white (65%), physicians expected more visits to pay with private pay (67%), to not pay with government pay (98%), not have an other form of pay (98%), fell within the Class I obesity classification (55%), spent between 11 and 20 minutes with the physician (53%), did not have their obesity check box marked off (72%), was seen for a chronic problem that was routine (35%), and was seen in an urban location (92%) **(Table 4.1)**.

Overall between 2008 and 2010, 70.3% of visits had no type of counseling provided during a primary care visit, while only 7.6% had all 3 types of counseling provided **(Table 4.2)**. Diet/nutrition and exercise health education counseling were provided in 5.8% of all visits, diet/nutrition in 5.7%, exercise in 3.5%, weight reduction in 3.3%, diet/nutrition and weight reduction in 2.5%, and exercise and weight reduction in 1.3% of visits **(Table 4.2)**.

Counseling was significantly associated with patients aged 45-64 (0.0014), non-White (0.0253), had the obesity check box checked (0.0001), being seen for a chronic problem-routine visit (<0.001), and had Class III obesity (<0.001) **(Table 4.3)**. All categories within the age variable were most likely to receive all three types of counseling the most if counseling was provided during the visit. When a patient's race is missing, physicians are most likely to provide diet/nutrition counseling only; whereas, if

Table 4.1 Sample Patient Characteristics

Summary Patient Characteristics (N=11,041), % (SE)		
Patient Characteristics		% (SE)
Gender		
	Male	39.07(0.82)
	Female	60.93(0.82)
Age		
	18-44	28.99(0.79)
	45-64	45.25(0.76)
	65 and Above	25.76(0.81)
Race		
	White	65.02(1.61)
	Non-White	13.73(1.27)
	Missing	21.26(1.59)
Expected Payment Type		
	Private Pay - Yes	66.59(1.41)
	Private Pay - No	33.41(1.41)
	Government Pay- Yes	2.15(0.42)
	Government Pay - No	97.85(0.42)
	Other - Yes	1.82(0.35)
	Other - No	98.18(0.35)
BMI		
	Class I Obesity	54.83(0.72)
	Class II Obesity	25.22(0.55)
	Class III Obesity	19.95(0.61)
Time with Physician		
	0-10 minutes	15.04(0.96)
	11-20 minutes	53.35(1.41)
	21-30 minutes	21.37(1)
	31 minutes and Above	10.24(0.72)
	Missing	6
Obesity Check Box		
	Box Checked - Yes	28.26(1.19)
	Box Not Checked - No	71.74(1.19)
Major Reason for Visit		
	New Problem	31.75(0.84)
	Chronic Problem - Routine	34.5(1.02)
	Chronis Problem - Flare up	9.58(0.67)
	Pre/Post Surgery	8.11(0.59)
	Preventive Care	16.06(0.75)
	Missing	216
Urban/Rural		
	Urban	92.31(1.29)
	Rural	7.69(1.29)
	Missing	306

Table 4.2 Sample Counseling Characteristics – Based on Patient Variables

Summary Counseling Characteristics (N=11,041), % (SE)		
Counseling Characteristics		% (SE)
Counseling Provided		
	No Counseling	70.33(1.47)
	All 3 Types of Counseling	7.6(0.86)
	Diet and Exercise Counseling	5.82(0.57)
	Diet Counseling	5.7(0.39)
	Exercise and Weight Reduction Counseling	1.29(0.17)
	Exercise Counseling	3.46(0.38)
	Diet and Weight Reduction Counseling	2.48(0.24)
	Weight Reduction Counseling	3.32(0.32)

Table 4.3 Health Education Counseling Provided by Patient Characteristics

Chi-Square Analysis - Patient Characteristics, % (SE)		No Counseling Provided	All Types of Counseling	Diet and Exercise Counseling	Diet Counseling Only	Exercise and Weight Reduction Counseling	Exercise Counseling Only	Diet and Weight Reduction Counseling	Weight Reduction Counseling Only
Gender by Counseling									
	Males	70.21(1.7)	8.34(1.12)	5.62(0.68)	5.89(0.62)	0.96(0.24)	3.31(0.44)	2.8(0.4)	2.91(0.38)
	Females	70.14(1.56)	7.15(0.85)	5.94(0.65)	5.57(0.43)	1.51(0.21)	3.55(0.43)	2.28(0.27)	3.59(0.39)
Age by Counseling									
	18-44	**71.14(1.76)**	**7.59(1.16)**	**5.16(0.6)**	**4.84(0.54)**	0.92(0.23)	**3.12(0.5)**	**3.21(0.42)**	**4.01(0.5)**
	45-64	**67.92(1.67)**	**8.28(0.96)**	**6.58(0.74)**	**5.96(0.48)**	1.67(0.28)	**3.62(0.46)**	**2.5(0.37)**	**3.47(0.46)**
	65 and Above	**73.64(1.93)**	**6.41(1.05)**	**5.2(0.78)**	**6.2(0.84)**	1.06(0.3)	**3.55(0.5)**	**1.65(0.34)**	**2.28(0.42)**
Race by Counseling									
	White	**70.48(1.63)**	**8.29(1.03)**	**5.35(0.66)**	**5.51(0.46)**	1.2(0.23)	**3.45(0.48)**	**2.35(0.28)**	**3.36(0.4)**
	Non-White	**65.8(2.96)**	**8.92(1.56)**	**8.15(1.41)**	**6.47(0.91)**	1.67(0.45)	**2.81(0.58)**	**3.66(0.78)**	**2.53(0.52)**
	Missing	**72.81(2.43)**	**4.62(1.47)**	**5.73(0.78)**	**5.76(0.84)**	1.34(0.29)	**3.9(0.47)**	**2.13(0.39)**	**3.71(0.69)**
Payment by Counseling									
	Private Pay - Yes	70.1(1.41)	7.57(0.98)	6.16(0.66)	5.75(0.48)	1.12(0.17)	3.23(0.38)	2.62(0.3)	3.45(0.34)
	Private Pay - No	70.79(2.3)	7.65(1.28)	5.14(0.66)	5.59(0.53)	1.63(0.34)	3.91(0.63)	2.21(0.36)	3.07(0.63)
	Government Pay - Yes	**80.95(4.46)**	1.68(1.14)	1.37(0.85)	0.18(0.19)	3.54(1.6)	9.3(2.62)	0.76(0.57)	2.21(1.44)
	Government Pay - No	70.1(1.5)	7.73(0.88)	5.91(0.59)	5.82(0.39)	1.24(0.16)	3.33(0.37)	2.52(0.25)	3.35(0.33)
	Other Pay - Yes	74.63(3.69)	3.01(1.51)	8.79(2.65)	4.1(1.44)	0.55(0.55)	2.6(1.12)	4(1.68)	2.32(1.48)
	Other Pay - No	70.25(1.49)	7.68(0.88)	5.76(0.58)	5.73(0.4)	1.31(0.17)	3.47(0.38)	2.46(0.25)	3.34(0.33)
Time with Physician									
	0-10 minutes	73.17(2.77)	8.13(1.98)	5.23(1.49)	4.07(0.64)	0.93(0.34)	3.33(0.78)	1.51(0.41)	3.63(1.18)
	11-20 minutes	71.5(1.57)	6.54(0.93)	6.17(0.62)	5.48(0.46)	1.13(0.2)	3.53(0.43)	2.67(0.34)	2.97(0.33)
	21-30 minutes	67.47(2.14)	8.07(1.32)	5.53(0.75)	7.83(1.11)	1.47(0.32)	3.59(0.54)	2.39(0.48)	3.65(0.72)
	30 minutes and above	65.85(3.47)	11.4(3.59)	5.45(0.88)	4.77(1.01)	2.29(0.78)	3(0.72)	3.19(0.71)	4.05(0.86)
Obesity Check Box									
	Box Checked - Yes	**49.67(2.03)**	**16.92(2.02)**	**7.83(0.86)**	**7.08(0.7)**	**2.74(0.45)**	**2.59(0.42)**	**5.33(0.62)**	**7.84(0.85)**
	Box Checked - No	**78.47(1.4)**	**3.93(0.62)**	**5.02(0.57)**	**5.15(0.45)**	0.72(0.15)	**3.8(0.44)**	1.36(0.21)	**1.54(0.27)**
Major Reason for Visit									
	New Problem	**77.79(1.39)**	**4.02(0.49)**	**4.6(0.89)**	**4.65(0.49)**	0.92(0.19)	**3.03(0.37)**	**2.01(0.36)**	**2.98(0.42)**
	Chronic Problem - Routine	**64.14(2.28)**	**10.83(1.54)**	**6.31(0.74)**	**6.42(0.79)**	1.83(0.3)	**3.3(0.51)**	**3.24(0.46)**	**3.93(0.68)**
	Chronic Problem - Flare Up	**74.99(2.39)**	**5.38(1.02)**	**3.37(0.71)**	**4.12(0.66)**	1.12(0.53)	**6.57(1.48)**	1.95(0.58)	**2.49(0.55)**
	Pre-Post Surgery	**81.74(2.89)**	**4.59(1.95)**	2.1(0.7)	**2.68(0.75)**	0.81(0.48)	**5.28(1.1)**	1.39(0.59)	1.42(0.48)
	Preventive Care	**62.23(2.42)**	**8.6(1.72)**	**10.44(1.28)**	**8.26(1.18)**	1.35(0.51)	**1.91(0.41)**	**3(0.55)**	**4.21(0.66)**
BMI									
	Class I Obesity	**74.63(1.52)**	**5.6(0.81)**	**5.45(0.65)**	**5.7(0.51)**	0.76(0.15)	**3.72(0.44)**	**1.79(0.28)**	**2.35(0.37)**
	Class II Obesity	**69.66(1.69)**	**8.58(1.18)**	**5.33(0.66)**	**5.7(0.58)**	1.16(0.27)	**3.35(0.47)**	**2.31(0.35)**	**3.92(0.52)**
	Class III Obesity	**59.36(2.17)**	**11.85(1.56)**	**7.43(0.96)**	**5.7(0.63)**	2.92(0.54)	**2.89(0.47)**	**4.62(0.65)**	**5.23(0.68)**
Urban/Rural									
	Urban	69.94(1.49)	7.94(0.93)	5.92(0.61)	5.72(0.4)	1.32(0.19)	3.39(0.38)	2.54(0.27)	3.23(0.32)
	Rural	74.23(3.82)	4.16(0.93)	4.36(1.29)	5.21(1.56)	1.04(0.38)	4.84(1.04)	1.51(0.57)	4.66(1.37)
Significant difference indicated by p-value < 0.05									
Highlighted indicates unreliable estimate									

Control variables (provider characteristics) were held constant and include: Physician degree (MD, DO), Practice ownership (physician or physician group, HMO, community health center, other), EMR implementation (yes-all electronic, yes-part paper/part electronic, no, unknown), EMR clinical reminder (yes, no), and Physician specialty (primary care practice, other).

their race is documented they receive all 3 types of counseling the most. When a patient's obesity check box is checked, physicians are most likely to provide all 3 types of counseling; while, if the patient's obesity check box is not checked they receive only diet counseling. When a patient is seen for a new problem they receive diet/nutrition counseling the most, for chronic problem-routine they receive all 3 types of counseling the most, for chronic problem-flare-up and pre/post-surgery they receive only exercise counseling the most, and for preventive care they receive diet/nutrition and exercise counseling the most. When a patient has Class I obesity they receive only diet/nutrition counseling the most; whereas, Class II and III receive all 3 types of counseling the most.

The adjusted model, with only individual counseling portrayed, shows that there is a significant difference in the likelihood of receiving all 3 types of counseling versus not based on the patient's age, the obesity check box status on the encounter form, the patient's reason for visit, and their obesity class category **(Table 4.4)**. This model also shows that there is a significant difference in the likelihood of receiving diet/nutrition counseling alone versus not based on the patient's race (0.0153) and whether they are in a rural or urban location (0.0146) **(Table 4.4)**.

The multiple logistic regression models show that odds are increased for the patient to receive all 3 types of health education counseling when their obesity check box is checked versus unchecked (odds ratio [95%CI]: 0.33 [0.27-0.41] for diet/nutrition; 0.42 [0.33-0.54] for exercise; 0.19 [0.15-0.25] for weight reduction); when they are being seen for a preventive visit versus a new problem visit (odds ratio [95%CI]: 0.42 [0.31-0.56] for diet/nutrition; 0.49 [0.36-0.67] for exercise; 0.46 [0.33-0.65] for weight reduction); when they are being seen for a preventive care visit versus a pre/post-surgery

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Table 4.4 Individual Health Education Counseling by Patient Characteristics

Chi-Square Individual Analysis - Patient Characteristics, % (SE)		Any Diet Nutrition Counseling	No Diet Nutrition Counseling	p-Value	Any Exercise Counseling	No Exercise Counseling	p-Value	Any Weight Reduction Counseling	No Weight Reduction Counseling	p-Value
Variables										
Gender	Female	20.95(1.29)	79.05(1.29)	0.1703	18.15(1.4)	81.85(1.4)	0.9715	14.52(1.01)	85.48(1.01)	0.6701
	Male	22.61(1.49)	77.39(1.49)		18.19(1.53)	81.81(1.53)		14.97(1.29)	85.03(1.29)	
Age	18-44	20.81(1.53)	79.19(1.53)	0.0345*	16.79(1.53)	83.21(1.53)	0.0074*	15.73(1.28)	84.27(1.28)	0.001*
	45-64	23.31(1.4)	76.69(1.4)		20.15(1.5)	79.85(1.5)		15.91(1.19)	84.09(1.19)	
	65 and Above	19.47(1.67)	80.53(1.67)		16.23(1.62)	83.78(1.62)		11.4(1.25)	88.6(1.25)	
Race	White	21.51(1.33)	78.49(1.33)	0.0153*	18.3(1.57)	81.7(1.57)	0.1056	15.21(1.18)	84.79(1.18)	0.1277
	Non-White	27.21(2.59)	72.79(2.59)		21.55(2.59)	78.45(2.59)		16.78(2.1)	83.23(2.1)	
	Missing	18.24(2.21)	81.76(2.21)		15.59(1.65)	84.41(1.65)		11.8(1.8)	88.2(1.8)	
Private Pay	Yes	22.1(1.25)	77.9(1.25)	0.3844	18.08(1.34)	81.92(1.34)	0.8953	14.77(1.08)	85.23(1.08)	0.899
	No	20.6(1.83)	79.4(1.83)		18.33(2.01)	81.67(2.01)		14.56(1.57)	85.44(1.57)	
Government Pay	Yes	3.99(1.81)	96.01(1.81)	<.0001*	15.9(3.69)	84.1(3.69)	0.5768	8.19(3.01)	91.81(3.01)	0.0935
	No	21.51(1.23)	78.02(1.25)		18.22(1.35)	81.78(1.35)		14.84(1.02)	85.16(1.02)	
Other Pay	Yes	19.9(3.11)	80.1(3.11)	0.6105	14.95(3.12)	85.05(3.12)	0.3519	9.88(3.14)	90.12(3.14)	0.2109
	No	21.63(1.25)	78.37(1.25)		18.23(1.34)	81.77(1.34)		14.79(1.03)	85.21(1.03)	
Time with Physician	0-10 minutes	18.94(2.3)	81.06(2.3)	0.2239	17.61(2.4)	82.39(2.4)	0.3865	14.19(2.43)	85.81(2.43)	0.0638
	11-20 minutes	20.86(1.39)	79.14(1.39)		17.38(1.45)	82.62(1.45)		13.31(1.03)	86.69(1.03)	
	21-30 minutes	23.82(2.11)	76.18(2.11)		18.66(1.63)	81.34(1.63)		15.57(1.67)	84.43(1.67)	
	30 minutes+	24.81(3.39)	75.19(3.39)		22.14(3.6)	77.86(3.6)		20.92(3.68)	79.08(3.68)	
Obesity Check	Yes	37.16(2.07)	62.84(2.07)	<.0001*	30.08(2.08)	69.92(2.08)	<.0001*	32.83(2.02)	67.17(2.02)	<.0001*
	No	15.47(1.09)	84.54(1.09)		13.47(1.24)	86.53(1.24)		7.56(0.75)	92.44(0.75)	
Visit Reason	Preventive care	30.31(2.37)	69.69(2.37)	<.0001*	22.3(2.29)	77.7(2.29)	<.0001*	17.16(1.77)	82.84(1.77)	<.0001*
	New Problem	15.28(1.21)	84.72(1.21)		12.57(1.15)	87.43(1.15)		9.93(0.79)	90.07(0.79)	
	Chronic Problem - Routine	26.8(1.92)	73.2(1.92)		22.27(2.03)	77.73(2.03)		19.83(1.77)	80.17(1.77)	
	Chronic Problem - Flare Up	14.83(1.71)	85.18(1.71)		16.45(2.21)	83.55(2.21)		10.94(1.41)	89.06(1.41)	
	Pre/Post Surgery	10.75(2.75)	89.25(2.75)		12.77(2.26)	87.23(2.26)		8.21(2.5)	91.79(2.5)	
BMI	Class I	18.54(1.27)	81.46(1.27)	<.0001*	15.53(1.35)	84.47(1.35)	<.0001*	10.5(0.98)	89.5(0.98)	<.0001*
	Class II	21.91(1.44)	78.09(1.44)		18.42(1.49)	81.58(1.49)		15.96(1.39)	84.04(1.39)	
	Class III	29.6(1.9)	70.4(1.9)		25.1(2.13)	74.9(2.13)		24.63(1.71)	75.37(1.71)	
Urban/Rural	Urban	22.12(1.28)	77.88(1.28)	0.0146*	18.57(1.39)	81.43(1.39)	0.0957	15.03(1.08)	84.97(1.08)	0.081
	Rural	15.24(2.49)	85(1.28)		14.39(2.25)	85.61(2.25)		11.36(1.79)	88.64(1.79)	
* Signficant difference indicated by p-value < 0.05										
Highlighted indicates unreliable estimate										
Control variables (provider characteristics) were held constant and include: Physician degree (MD, DO), Practice ownership (physician or physician group, HMO, community health center, other), EMR implementation (yes-all electronic, yes-part paper/part electronic, no, unknown), EMR clinical reminder (yes, no), and Physician specialty (primary care practice, other).										

visit (odds ratio [95%CI]: 0.28 [0.17-0.46] for diet/nutrition; 0.46 [0.28-0.76] for exercise; 0.30 [0.16-0.56] for weight reduction); when they are categorized as having Class III obesity versus Class I obesity (odds ratio [95%CI]: 1.38 [1.15-1.67] for diet/nutrition; 1.39 [1.11-1.74] for exercise; 1.59 [1.21-2.09] for weight reduction); and when they are in an urban versus rural location (odds ratio [95%CI]: 0.57 [0.39-0.85] for diet/nutrition; 0.65 [0.43-0.99] for exercise; 0.63 [0.44-0.92] for weight reduction) while controlling for all other variables **(Table 4.5).**

Discussion

This study found several differences in the provision of health education counseling provided to obese adult patients during primary care visits. There is an overall lack of any type of obesity health education counseling occurring during primary care visits (70.3% of obese patient visits had no counseling provided). Research has shown that patients are highly motivated to lose weight but prefer not want to change their diet in the process.[42] Thus, primary health care providers have a unique opportunity to provide the patient with exercise and/or weight reduction counseling in an effort to address their weight. When looking at the individual types of counseling provided during patient visits, patients were most likely to receive diet/nutrition counseling as opposed to exercise or weight reduction counseling. This would most likely result in the patient's failure to lose weight since they are interested in losing weight but not through diet modifications alone.

The most significant findings from this study reveal that the odds are increased for certain patient characteristics when compared to others. The odds of a patient visit with the obesity check box checked receiving diet/nutrition counseling is 0.33 times

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Table 4.5 Factors Associated with Receipt of Health Education Counseling by Patient Characteristics

Odds Ratios – Patient Characteristics, (95% confidence intervals) (N=9,804)				
Variables		Diet Nutrition	Exercise	Weight Reduction
Gender	Female vs Male[1]	0.73[0.63-0.85]***	0.88[0.74-1.05]	0.76[0.63-0.92]**
Age	45-64 vs 18-44[1]	1.23[1.02-1.48]**	1.27[1.08-1.49]**	0.99[0.81-1.22]*
	65 and Above vs 18-44	1.01[0.78-1.31]	1[0.77-1.31]	0.66[0.51-0.86]**
Race	Non-White vs White[1]	1.27[0.98-1.65]*	1.21[0.89-1.63]	0.99[0.75-1.3]
	Missing vs White	0.8[0.58-1.12]*	0.87[0.63-1.19]	0.77[0.52-1.12]
Private Pay	No vs Yes[1]	0.87[0.71-1.08]	0.98[0.75-1.27]	1[0.77-1.29]
Government Pay	No vs Yes[1]	4.12[1.67-10.2]**	0.82[0.41-1.65]	1.25[0.51-3.03]
Other Pay	No vs Yes[1]	1.3[0.8-2.09]	1.38[0.77-2.49]	2.11[1-4.42]*
Time with Physician	0-10 minutes vs 11-20 minutes[1]	0.87[0.65-1.16]*	1.02[0.74-1.42]	1.05[0.72-1.54]
	21-30 minutes vs 11-20 minutes	1.23[0.95-1.59]	1.15[0.89-1.49]	1.36[0.98-1.88]
	30 minutes+ vs 11-20 minutes	1.26[0.88-1.8]	1.37[0.93-2.01]	1.82[1.22-2.72]*
Obesity Check Box	No vs Yes[1]	0.33[0.27-0.41]***	0.42[0.33-0.54]***	0.19[0.15-0.25]***
Visit Reason	New Problem vs Preventive Care[1]	0.42[0.31-0.56]**	0.49[0.36-0.67]**	0.46[0.33-0.65]**
	Chronic Problem - Routine vs Preventive Care	0.83[0.61-1.13]***	0.92[0.65-1.28]**	1.07[0.75-1.54]***
	Chronic Problem – Flare up vs Preventive Care	0.44[0.31-0.62]	0.65[0.43-1]	0.53[0.36-0.8]
	Pre/Post Surgery vs Preventive Care	0.28[0.17-0.46]**	0.46[0.28-0.76]*	0.3[0.16-0.56]**
BMI	Class II vs Class I [1]	1.04[0.89-1.21]	1.03[0.84-1.26]	1.16[0.93-1.44]
	Class III vs Class I	1.38[1.15-1.67]**	1.39[1.11-1.74]**	1.59[1.21-2.09]**
Urban/Rural	Rural vs Urban[1]	0.57[0.39-0.85]**	0.65[0.43-0.99]*	0.63[0.44-0.92]*
* p < 0.05. ** p < 0.01. *** p < 0.0001.				
[1] Denotes the referent level				
Control variables (provider characteristics) were held constant and include: Physician degree (MD, DO), Practice ownership (physician or physician group, HMO, community health center, other), EMR implementation (yes-all electronic, yes-part paper/part electronic, no, unknown), EMR clinical reminder (yes, no), and Physician specialty (primary care practice, other).				

higher than those visits with the check box unchecked, 0.42 times higher to receiving exercise counseling, and 0.19 times higher to receiving weight reduction counseling. This outcome would be expected since the physician indicates, through the checking of the box, that they are aware the patient has obesity. The odds of a patient visit for preventive care receiving diet/nutrition counseling is 0.42 times higher than those visits for a new problem, 0.49 times higher to receiving exercise counseling, and 0.65 times higher to receiving weight reduction counseling. This would also be an expected outcome since a preventive care visit has been found to be the most likely type of visit for health education counseling to occur.[29,57] Yet, if the patient is being seen for a new problem that is related to their obesity or high weight, this would not be expected. It would take further investigation to determine the relationship between new problems that arise in obese patient and the provision of health education counseling. Moreover, the odds of a patient visit for preventive care visit receiving diet/nutrition counseling is 0.28 times higher than those visits for pre/post-surgery, 0.46 times higher to receiving exercise counseling, and 0.56 times higher to receiving weight reduction counseling.

Aligning with previous research, the odds of a patient visit with Class III obesity receiving diet/nutrition counseling is 1.38 times higher than those visits with Class I obesity, 1.39 times higher to receiving exercise counseling, and 1.60 times higher to receiving weight reduction. Several studies found that physicians recognize and provide counseling more for patients who have higher BMIs.[25,51,72,73] This study confirms that patients with Class III obesity have increased odds of receiving counseling compared to those who are less obese. This result is essential for physicians to be cognizant of because physicians may be able to make more progress in patient's losing weight if they target

those with lower BMIs to make life-style modifications before their weight is uncontrollable.[29] Lastly, the odds of a patient visit in an urban location receiving diet/nutrition counseling is 0.57 times higher than those visits in an rural location, 0.65 times higher to receiving exercise counseling, and 0.63 times higher to receiving weight reduction counseling. There is little research available on the differences seen in preventive services provided in urban versus rural primary care practices. However, it has been noted that the practice location (urban versus rural) impacts the physician's adherence, or lack thereof, to preventive services recommendations.[95] Patients in rural locations tend to have less frequent visits to the physician due to the distance between their homes and the practice.[95] This means that physicians should pay extra close attention to their counseling practices in rural areas since those individuals are seen less frequently and have less opportunities to provide the counseling.

Studies have also found that, while still unclear and inconsistent, there is a relationship between patient age and the delivery of counseling. One study found that there appears to be an increasing relationship between age and receiving more counseling until ages 55-65, then it begins to decrease.[51] This would mean middle aged individuals receive the most counseling during primary care encounters. The results from this study align with previous findings because counseling was significantly associated with patients aged 45-64, meaning that middle aged patient visits were most likely to receive counseling. However, in regards to weight reduction counseling, patient's aged 18-44 years had increased odds of receiving weight reduction counseling when compared to patient's aged 45-64.This could be a result of physicians addressing weight concerns earlier in life, rather than later, so that the patient's weight is less debilitating which could

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result in increased quality of life as they age. It would take further research to justify this assumption.

While some results from this study align with previous research findings, there are a couple of unique results that provide new insight into some patient characteristics and their influence on physician's provision of obesity counseling. Some studies have found that there is no significant difference in the odds of receiving health education counseling overall.[18] Yet, this study found several differences in the odds of receiving counseling based on patient characteristics (obesity check box, preventive care visit, Class III obesity, and urban location). These differences could mean that these patient characteristics have begun to influence the likelihood of physicians to provide counseling to obese patients during primary health care encounters. Thus, physicians will need to pay close attention to these patient characteristics to ensure they are providing adequate counseling to all adult obese patients. Additionally, a previous study found that the more time spent with physicians during a visit increased the likelihood of receiving obesity counseling when compared to those who spent less time.[74] Yet this study found no significance in the time spent with the physician on the delivery of obesity counseling. Since obesity counseling only takes 3-5 minutes to provide during a patient visit it would seem that all patient visits, regardless of time spent with the physician, could receive this recommended counseling.[17,47]Overall, there has not been a significant change in physician's provision of health education counseling to adult obese patient since 2008 even with the rise in awareness and focus on obesity within the US.

The strengths of this study include the large sample size from NAMCS. The entire sample aggregated from 2008-2010 of obese patients treated was 11,041. This number

was decreased to 9,804 during the logistic regression analysis, which still provides a large sample size for the study. Furthermore, this survey provides a vast amount of information that several conclusions can be drawn from due to the extensiveness of the information collected. There are some limitations within this study. First, this study is based on a survey that is from one patient visit and not representative of an on-going treatment of a patient. Therefore, we are only able to identify patients who are categorized as obese and whether they received counseling during the visit that was recorded on the encounter form. Second, NAMCS has been found to be more accurate for procedure and examination data than for health behavior counseling data due to underreporting issues.[88] Yet, the NAMCS survey is still considered an accurate tool for measurement of the health-related topics contained within the form.[88] Third, we are unable to identify if a patient has been included more than once within this population since the data is de-identified. Lastly, the USPSTF recommendation for obese adults has a limitation in regards to the intervals of screening due to the lack of evidence of interval times in research studies.[10] While there are some limitations, NAMCS is routinely used to establish national trends that are representative of the population as a whole for many policy-related, health services, and other health-related topics.

While this study provides some new insight into patient characteristics that influence the physician's likelihood to provide counseling in a primary care visit, there is still more research needed to further understand the lack of counseling that occurs. First, further research is needed in the area of the USPSTF recommendations on the time intervals of the health education counseling for adult obese patients. This would allow the recommendations to be more specific in the duration and interval times that the

counseling must occur to be most beneficial to the patient. Second, it is important to determine what patient characteristics impacts the types of counseling the physician decides to provide the most during a visit.[3,10] Likewise, investigation into the type of counseling that has the greatest benefit to the patient is needed so that physicians can focus on the type most likely to bring about life-style modifications and weight loss. Lastly, it is essential for research to investigate the differences found in the provision of counseling based on the obesity check box status, preventive care visits, the patient's class of obesity, and the urban versus rural location of the visit.

Although physicians see a vast amount of adult obese patients within primary care practice, health education counseling practices by primary care physicians remains less than optimal. Therefore, there is a drastic need to improve this type of health education counseling by primary care physicians in order to address the current obesity epidemic in the U.S. Given the current epidemic and the limited time available during primary care visits, the need to understand, with consistency, what patient characteristics influence the provision of obesity counseling is vital for physicians. This will ensure physicians are maximizing their counseling efforts during their encounters.

CHAPTER 5 MANUSCRIPT II

5.1 PROVIDER CHARACTERISTICS INFLUENCING PRIMARY CARE OBESITY COUNSELING PRACTICES [2]

Abstract

Background: The United States Preventive Services Task Force (USPSTF) recommends three types of health education counseling for use in primary care practices for adult, obese patient (BMI > 30 kg/m^2). While these recommendations are well known, they are not practiced routinely across the board. The objective of this study was to investigate the provider characteristics that may influence counseling practices of primary care physicians. **Methods:** We analyzed cross-sectional data that was aggregated from 2008-2010 from the National Ambulatory Medical Care Survey (NAMCS). The three types of health education counseling were the dependent variables, while provider characteristics were the independent variables along with patient characteristics as control variables. **Results:** Of the 9,804 obese patient visits analyzed the odds are increased for the patient to receive diet/nutrition health education counseling when the visit is conducted by a physician with a MD degree versus a physician with a DO degree (odds ratio [95%CI]: diet/nutrition; 0.69 [0.49-0.97] and when they are seen by a physician with primary care specialty (family medicine, general medicine, internal medicine, and OBGYN) versus a physician with another specialty (odds ratio [95%CI]: diet/nutrition; 0.65 [0.47-0.88] while controlling for all other variables. **Conclusion:** Given the current obesity epidemic

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and mounting responsibilities added to primary care visits to deal with chronic diseases, the need to understand what provider characteristics influence the odds of patients receiving counseling is vital so that physicians are aware of their shortcomings counseling behavior with their obese patients.

Introduction

If the patient has a Body Mass Index (BMI) of 30 kg/m^2 or higher, it is recommended to provide or refer the patient to intensive, multicomponent behavioral interventional including three types of health counseling – diet/nutrition, exercise, and weight reduction.[18] While these recommendations are well known from the USPSTF, a low percentage of physicians provide this counseling consistently to their patient populations.[5,16,29,94] While it is known that primary care physicians do not tend to provide the recommended counseling, there is little consistently known on the influence of provider characteristics on the likelihood of a physician to provide this counseling to their patients.

In addition to the adverse health effects associated with obesity, studies have found that obesity accounts for 5% to 7% of national health expenditures in the US.[26] With rising prevalence, increased comorbidities, and a spreading epidemic, obesity is associated with $2,741 higher than average annual medical care costs (in 2005 dollars) with $3,613 for women and $1,152 for men.[27] Thus, in 2005, estimates of the national medical care costs of obesity-related illness in adults were $209.7 billion, twice the estimate of $85.7 billion in earlier literature.[27] With the rising cost of healthcare overall and the costs associated with obesity further adding to the problem, addressing the obesity epidemic is paramount. The United State Preventive Services Task Force

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(USPSTF) provides recommendations for a multitude of diseases and conditions. This study will focus on the USPSTF recommendations for the adult, obese population of patient visits in primary care practice between 2008 and 2010. USPSTF bases its recommendations on the evidence of the benefits and harms of the service and as an assessment of the balance between the two.[3] It does not consider the cost of providing a service within this assessment.[3] Yet, the USPSTF guidelines stress important themes applicable to obesity management policies and guidelines around the world.[10]

A vast majority of Americans cite their physician as their primary source of information about health.[5] Hence, physicians represent a credible source of health information for their patients, who may be receptive to information about their health-related issues during office visits.[5] Family practitioners, internists, and endocrinologists reported treating obesity themselves in only about 50% of their obese patients, whereas other groups reported intervening with only 5% to 29% of obese patients, but expressed greater interest in making referrals.[25] Physicians express high concern with management of obesity but vary in the interest in assuming this role themselves. Thus, physicians do not always attempt to provide health education counseling to their obese patients due to many barriers including restraints on time, lack of education, and sensitivity of the topic.

The main objective of this study was to investigate provider characteristics that may influence the likelihood of primary care physicians to provide obesity health education counseling to adult, obese patient visits aggregated from 2008 through 2010. Several of these characteristics have been examined previously; however, they have not been examined since 2008 and with obesity and chronic disease management taking a lead role in society over the last few years, it is expected that counseling trends based on

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provider characteristics have changed since 2008. It is expected that physicians will provide more overall health education counseling when they have an electronic medical record (EMR) system implemented in the practice, have an EMR counseling reminder turned on, and who are of primary care practice specialty.

Study Conceptual Model

A study conceptual model was developed to describe how the dependent and independent variables are related to each other **(Figure 5.1)**. One base of the model was developed from the physician induced demand model that is included with variables under provider characteristics and behaviors[92,93]. The other model incorporated was from the Andersen's model[90,91], where there are predisposing (blue variables), enabling (green variables) and need (orange variables) factors are associated with health care delivery and serve as control variables within this study (listed down the side of Figure 5.1). The variables that fall into each of these categories can be classified as provider characteristics, patient characteristics, behaviors, or outcomes (listed across the top). While the outcomes of this study are the types of health education counseling, they are classified as health behaviors which make them intermediate outcomes within the model. The overall outcomes of the model will not be examined within this study, shaded grey for this reason, but would result in decreased patient BMI and decreased prevalence of obesity that could be measured long-term.

Materials and Methods

Data from this study were obtained from the National Ambulatory Medical Care Survey (NAMCS) which has been proven to be an accurate tool of assessing primary care related topics.[88] This is a cross-sectional study with data aggregated from 2008 to 2010.
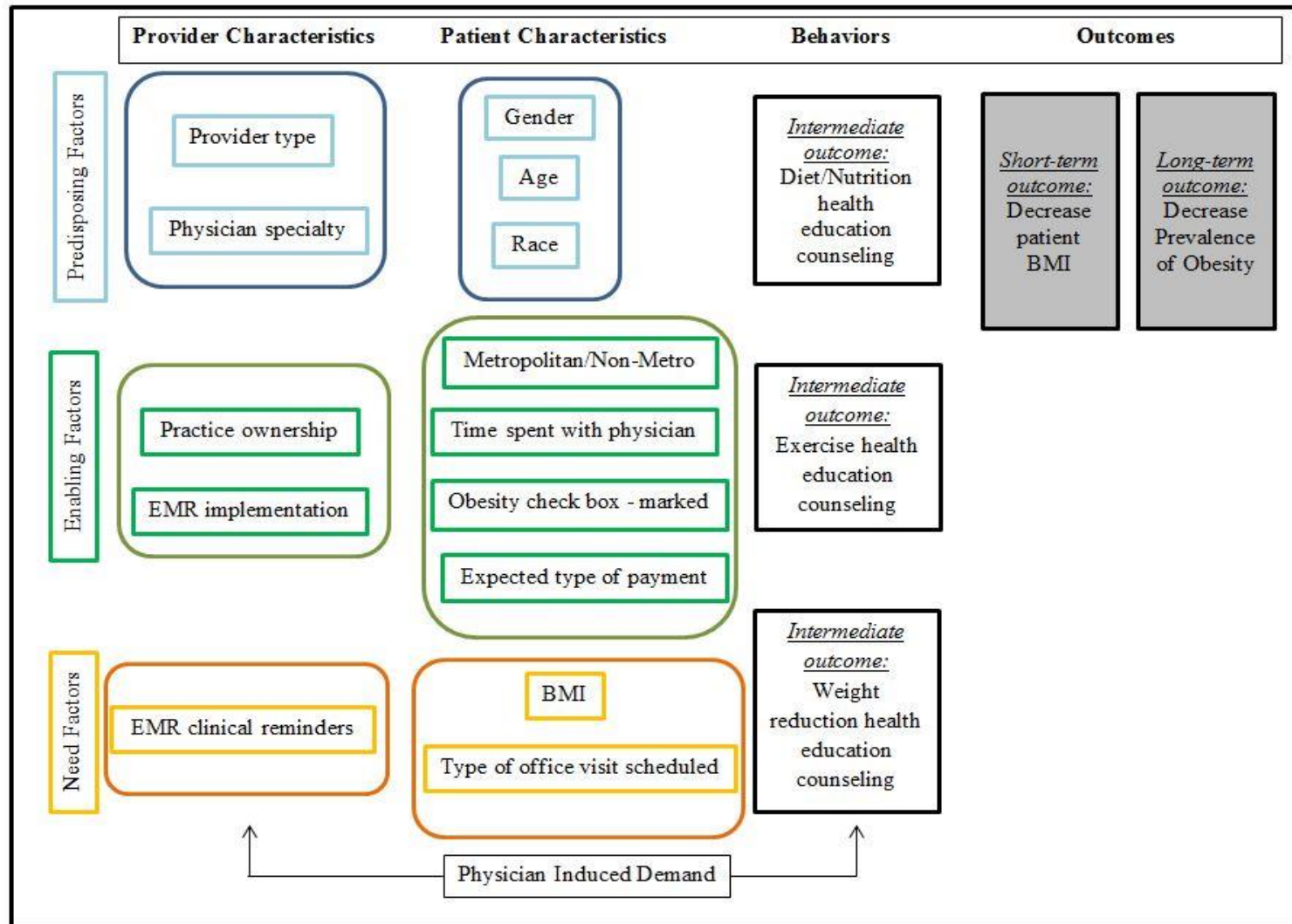
Figure 5.1 Study Conceptual Model – Provider Characteristics

NAMCS is a survey conducted by the National Center for Health Statistics (NCHS), which utilizes multistage probability sampling procedures that allow unbiased national estimates to be made from the data. The unit of analysis for this survey is the patient visit. The physician, with staff assistance, fills out a standard encounter form for the selected patient visits. This form includes information on patient demographics, comorbidities, medications, reason for visit, visit procedures and characteristics, physician characteristics, practice information, diagnostic information, and other medical services provided during the time of the visit.

Dependent variables

The dependent variables under investigation are the 3 types of health education counseling – diet/nutrition, exercise, and weight reduction – as indicated by a check box on the encounter forms. All 3 types of counseling were assessed for each year within the study, allowing for a 3 year aggregated analysis to take place. These variables are collected by physicians indicating, with a check mark, that they provided the counseling to their patients on the NAMCS encounter form. There is a defined process for filling out the survey, checking for completeness, fixing errors, and allowing for the visits to be selected randomly from those collected that can be found within the NAMCS documentation. The NAMCS documentation states that variables with sample counts of less than 10 or a standard error (SE) or 30% or less are considered unstable and should not be used to describe the population because they are considered unreliable. These unstable variables are flagged within each of the tables presented in this paper to indicate their unreliable estimates. Thus, even if it is indicated as significant, it will not be discussed.

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Provider characteristics

Provider characteristics consist of physician degree (MD and DO), practice ownership (physician or physician group, HMO, community health center, and other), electronic medical record (EMR) implementation (yes-all electronic, yes-part paper, part electronic, no, and unknown), EMR counseling reminder (yes-turned on, and no), and physician specialty (primary care [general and family, internal medicine, and OBGYN] and other [all other specialties]). The variable subcategories were selected after performing a univariate analysis and determining that some subcategories needed to be combined to have a large enough sample within each subcategory to run further analyses. The referent level used for each variable is the first subcategory listed above. No patient visits were excluded based on provider characteristics. However, patient visits were excluded if the patient was less than 18 years of age and/or had a BMI less than 30 kg/m^2. These characteristics were chosen based on the supplier (physician) induced demand (PID) model. The physician induced demand model reflects the idea that information between physicians and patients is asymmetric and a physician can shift the demand curve for their services when it is in the physician's self-interest to do so.[92,93] This shifting would involve a physician recommending care, such as a revisit, whether it is beneficial to the patient or not.[92,93] In this case, the recommended care would benefit the patient since it could potentially increase their health through the health education counseling visits and revisits.[92,93] Patient characteristics are included in the tables as control variables, but will not be discussed in this paper.

Statistical analyses were performed using SAS version 9.4. In NAMCS, each visit record is assigned a visit weight that accounts for unequal selection probabilities resulting from the sample design and nonresponse. All analyses took into account visit weights, which are available for the entire study span (2008-2010).

To determine the variations in the three types of health education counseling we compared the percentages from a univariate analysis and percentages with weighted frequencies from a bivariate chi-square analysis across the three types of counseling and possible combinations. Furthermore, to determine the types of health education counseling that were provided based on different provider characteristics we compared the adjusted model percentages from a bivariate chi-square analysis across the three types of counseling individually, as well as when no counseling occurs. Lastly, to determine the odds of receiving health education counseling for the different provider characteristics, multiple logistic regression models were used to report the odds ratio and 95% confidence intervals for each type of counseling individually. Three different models were used for the regressions, one for each type of counseling that could be provided during the visit. These were full models that included the provider characteristics along with the patient control variables.

Results

The majority of the population was physicians with a MD degree (90%), within a physician or physician group owned practice (80%), had full EMR implementation within the practice (62%), had EMR clinical reminders turned off (54%), and were of primary care specialty (62%) **(Table 5.1)**.

Table 5.1 Sample Provider Characteristics

Summary Provider Characteristics (N=11,041), % (SE)		
Physician Characteristics		% (SE)
Physician Degree		
	MD	89.51(1.04)
	DO	10.49(1.04)
Practice Ownership		
	Physician or Physician Group	79.86(1.41)
	HMO	2.54(0.54)
	Community Health Center	3.32(0.71)
	Other	14.29(1.38)
	Missing	79
EMR Implementation		
	Yes, All Electronic	7.09(2.34)
	Yes, Part Paper/Part Electronic	62.16(1.88)
	No	21.78(1.33)
	Don't Know	8.98(0.92)
	Missing	55
EMR Reminder Status		
	Yes, Turned On	46.36(2.17)
	No	53.64(2.17)
	Missing	635
Physician Specialty		
	Primary Care (General/Family/Internal/OBGYN)	61.87(1.73)
	Other	38.13(1.73)

Overall between 2008 and 2010, 70.3% of visits had no type of counseling provided during a primary care visit, while only 7.6% had all 3 types of counseling provided (**Table 5.2**). Diet/nutrition and exercise health education counseling was provided in 5.8% of all visits, diet/nutrition in 5.7%, exercise in 3.5%, weight reduction in 3.3%, diet/nutrition and weight reduction in 2.5%, and exercise and weight reduction in 1.3% of visits **(Table 5.2)**. Counseling was significantly associated with patients who are seen in a practice without an EMR implemented (0.0059) and when seen by a physician with a primary care specialty (<0.001) **(Table 5.3)**. When a patient is seen at a practice with full EMR or a practice with no EMR they receive all 3 types of counseling the most; yet, when they are seen at a practice that has part of an EMR or EMR status is unknown they only receive diet/nutrition education counseling. When a patient is seen by either a physician with a MD degree or a DO degree they receive all 3 types of counseling the most.

The adjusted model, with only individual counseling portrayed, shows that there is a significant difference in the likelihood of receiving diet/nutrition counseling based on the physician specialty (0.001) **(Table 5.4)**. Furthermore, this adjusted model shows that there is a significant difference in the likelihood of receiving exercise counseling based on the type of practice ownership (0.022) **(Table 5.4)**. The multiple logistic regression models show that odds are increased for the provision of diet/nutrition health education counseling only when patients are seen by a physician with a MD degree versus a DO degree (odds ratio [95%CI]: diet/nutrition; 0.69 [0.49-0.97]; and when they are seen by a primary care specialty physician versus a physician with another specialty (odds ratio [95%CI]: diet/nutrition; 0.65 [0.47-0.88]. **(Table 5.5)**.

Table 5.2 Sample Counseling Characteristics – Based on Provider Variables

Summary Counseling Characteristics (N=11,041), % (SE)		
Counseling Characteristics		% (SE)
Counseling Provided		
	No Counseling	70.33(1.47)
	All 3 Types of Counseling	7.6(0.86)
	Diet and Exercise Counseling	5.82(0.57)
	Diet Counseling	5.7(0.39)
	Exercise and Weight Reduction Counseling	1.29(0.17)
	Exercise Counseling	3.46(0.38)
	Diet and Weight Reduction Counseling	2.48(0.24)
	Weight Reduction Counseling	3.32(0.32)

Table 5.3 Health Education Counseling Provided by Provider Characteristics

Chi-Square Analysis - Provider Characteristics - Control Variables, % (SE)		No Counseling Provided	All Types of Counseling	Diet and Exercise Counseling	Diet Counseling Only	Exercise and Weight Reduction Counseling	Exercise Counseling Only	Diet and Weight Reduction Counseling	Weight Reduction Counseling Only
Variables									
MD/DO Status									
	MD	69.98(1.53)	7.49(0.9)	5.88(0.63)	5.88(0.43)	1.28(0.17)	3.51(0.41)	2.56(0.26)	3.41(0.34)
	DO	73.29(3.41)	8.49(3.05)	5.26(1.07)	4.13(0.71)	1.38(0.63)	2.98(0.67)	1.86(0.57)	2.61(1)
Practice Ownership									
	Physician or Physician Group	**69.78(1.69)**	**8.23(1.08)**	**5.86(0.66)**	**5.51(0.42)**	**1.41(0.21)**	**3.74(0.45)**	**2.11(0.26)**	**3.36(0.39)**
	HMO	**70.43(5.27)**	**2.21(1.22)**	**4.36(1.99)**	**4.89(1.67)**	**1.64(0.93)**	**2.9(1)**	**4.81(2.84)**	**8.76(2.75)**
	Community Health Center	**73.41(5.07)**	**6.69(3.02)**	**5.75(1.58)**	**6.01(1.71)**	**1.45(0.88)**	**1.61(0.61)**	**3.25(0.81)**	**1.82(0.68)**
	Other	**72.82(2.64)**	**5.4(1.47)**	**5.2(1.14)**	**6.98(1.31)**	**0.58(0.23)**	**2.47(0.65)**	**3.94(0.84)**	**2.61(0.49)**
EMR Implementation									
	Yes, All Electronic	**70.39(1.77)**	**8.15(1.16)**	**6.34(0.81)**	**5.15(0.42)**	**1.33(0.2)**	**3.25(0.43)**	**2.36(0.31)**	**3.04(0.36)**
	Yes, Part Paper/Part Elextronic	**73.03(2.23)**	**5.77(1.19)**	**4.96(0.83)**	**7.03(0.95)**	**1.34(0.36)**	**2.97(0.74)**	**2.32(0.39)**	**2.57(0.56)**
	No	**59.51(5)**	**11.11(3.96)**	**6.35(1.5)**	**6.17(1.36)**	**1.12(0.66)**	**5.91(2.15)**	**1.96(0.68)**	**7.86(2.28)**
	Unknown	**74.65(4.46)**	**4.05(2.16)**	**3.49(0.94)**	**5.59(2.04)**	**1.15(0.51)**	**3.64(1.59)**	**4.87(1.56)**	**2.55(0.86)**
EMR Reminder Status									
	Yes, Turned On	70.39(2.14)	7.87(1.51)	6.47(1.01)	5.57(0.6)	1.17(0.2)	2.68(0.25)	2.66(0.36)	3.18(0.55)
	No	69.91(1.87)	7.62(1.01)	5.53(0.65)	5.94(0.51)	1.42(0.28)	4(0.68)	2.04(0.29)	3.54(0.44)
Physician Specialty									
	Primary Care	**68.39(1.68)**	**8.22(1.01)**	**7.17(0.82)**	**6.82(0.54)**	**1.15(0.23)**	**2.42(0.38)**	**2.54(0.31)**	**3.28(0.37)**
	Other	**73.48(2.25)**	**6.59(1.53)**	**3.63(0.6)**	**3.87(0.47)**	**1.52(0.26)**	**5.14(0.72)**	**2.4(0.43)**	**3.38(0.62)**
Significant difference indicated by p-value < 0.05									
Highlighted indicates unreliable estimate									

Control variables (patient characteristics) were held constant and include: sex (male, female), age (18-44, 45-64, 65+), race (white, non-white, missing), private pay (yes, no), government pay (yes, no), other pay (yes, no), time with physician (0-10, 11-20, 21-29, 30+), obesity check box (yes, no), reason for visit (preventive care, new problem, chronic problem-routine, chronic problem-flare up, pre/post-surgery), BMI class (class I, class II, class III), and practice location (urban, rural).

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Table 5.4 Individual Health Education Counseling Provided by Provider Characteristics

Chi-Square Individual Analysis - Provider Control Characteristics, %, SE (No.)		Any Diet Nutrition Counseling	No Diet Nutrition Counseling	p-Value	Any Exercise Counseling	No Exercise Counseling	p-Value	Any Weight Reduction Counseling	No Weight Reduction Counseling	p-Value
Variables										
MD/DO	MD	21.81(1.24)	78.19(1.24)	0.5436	18.17(1.39)	81.83(1.39)	0.9863	14.74(1.06)	85.26(1.06)	0.9072
	DO	19.74(3.32)	80.26(3.32)		18.11(3.27)	81.89(3.27)		14.35(3.16)	85.65(3.16)	
Practice Ownership	Physician group	21.71(1.45)	78.29(1.45)	0.7988	19.24(1.58)	80.76(1.58)	0.0222*	15.11(1.23)	84.89(1.23)	0.5851
	HMO	16.27(3.56)	83.73(3.56)		11.11(2.88)	88.89(2.88)		17.41(4.73)	82.59(4.73)	
	Community Health Center	21.71(4.82)	78.29(4.82)		15.5(3.18)	84.5(3.18)		13.22(3.56)	86.78(3.56)	
	Other	21.52(2.45)	78.48(2.45)		13.65(2.1)	86.35(2.1)		12.53(1.81)	87.47(1.81)	
EMR Implementation	Yes, all Electronic	22(1.56)	78(1.56)	0.4718	19.07(1.6)	80.93(1.6)	0.0726	14.88(1.32)	85.12(1.32)	0.0659
	Don't Know	18.01(3.93)	81.99(3.93)		12.33(2.86)	87.67(2.86)		12.62(3.52)	87.38(3.52)	
	Yes, Part Paper/Part Electronic	20.09(1.89)	79.91(1.89)		15.04(1.77)	84.96(1.77)		12.01(1.57)	87.99(1.57)	
	No	25.6(4.26)	74.4(4.26)		24.49(5.68)	75.51(5.68)		22.05(4.12)	77.95(4.12)	
EMR Reminder	Yes	22.58(1.95)	77.42(1.95)	0.5033	18.2(1.89)	81.8(1.89)	0.8738	14.88(1.71)	85.12(1.71)	0.8985
	No	21.12(1.41)	78.88(1.41)		18.58(1.76)	81.42(1.76)		14.62(1.26)	85.38(1.26)	
Physician Specialty	Family/General/Int? OBGYN	24.75(1.48)	75.25(1.48)	0.0009*	18.96(1.63)	81.04(1.63)	0.3464	15.2(1.18)	84.8(1.18)	0.5702
	Other	16.48(1.92)	83.52(1.92)		16.87(1.79)	83.13(1.79)		13.88(1.9)	86.12(1.9)	
* Signficant difference indicated by p-value < 0.05										
Highlighted indicates unreliable estimate										
Control variables (patient characteristics) were held constant and include: sex (male, female), age (18-44, 45-64, 65+), race (white, non-white, missing), private pay (yes, no), government pay (yes, no), other pay (yes, no), time with physician (0-10, 11-20, 21-29, 30+), obesity check box (yes, no), reason for visit (preventive care, new problem, chronic problem-routine, chronic problem-flare up, pre/post-surgery), BMI class (class I, class II, class III), and practice location (urban, rural).										

Table 5.5 Factors Associated with Receipt of Health Education Counseling by Provider Characteristics

Odds Ratios – Provider Characteristics, (95% confidence intervals) (N=9,804)				
Variables		Diet Nutrition	Exercise	Weight Reduction
MD/DO	DO vs MD[1]	0.69[0.49-0.97]*	0.81[0.56-1.18]	0.7[0.48-1.03]
Practice Ownership	HMO vs Physician or Physician Group[1]	0.62[0.34-1.13]	0.53[0.24-1.15]	1.21[0.52-2.81]
	Community Health Center vs Physician or Physician Group	0.91[0.56-1.48]	0.77[0.47-1.26]	0.91[0.48-1.73]
	Other vs Physician or Physician Group	0.88[0.6-1.3]	0.73[0.47-1.12]	0.78[0.48-1.26]
EMR Implementation	Don't Know vs Yes, All Electronic[1]	0.69[0.36-1.34]	0.49[0.21-1.12]	0.68[0.35-1.3]
	Yes, Part Paper/Part Electronic vs Yes, All Electronic	0.99[0.74-1.34]	0.8[0.56-1.13]	0.9[0.63-1.29]
	No vs Yes, All Electronic	0.94[0.64-1.38]	1.04[0.57-1.88]	1.3[0.8-2.1]
EMR Reminder	No vs Yes[1]	0.92[0.71-1.19]	1.01[0.75-1.36]	0.9[0.65-1.26]
Physician Specialty	Other vs Family/General/Internal/OBGYN[1]	0.65[0.47-0.88]**	0.89[0.64-1.23]	1.01[0.66-1.54]
* p < 0.05.　　** p < 0.01.　　*** p < 0.0001.				
[1] Denotes the referent level				
Control variables (patient characteristics) were held constant and include: sex (male, female), age (18-44, 45-64, 65+), race (white, non-white, missing), private pay (yes, no), government pay (yes, no), other pay (yes, no), time with physician (0-10, 11-20, 21-29, 30+), obesity check box (yes, no), reason for visit (preventive care, new problem, chronic problem-routine, chronic problem-flare up, pre/post-surgery), BMI class (class I, class II, class III), and practice location (urban, rural).				

Discussion

This study found several differences in the provision of health education counseling provided to adult, obese patients during primary care visits. There is an overall lack of any type of obesity health education counseling occurring during primary care visits (70.3% of obese patient visits had no counseling provided). This low level of counseling could be attributed to the different views that physicians and the lay population hold in regards to the causes and treatment of obesity. Primary care physicians tend to believe that obesity is caused by behavioral, structural, social, and psychological factors, whereas, the lay population prefers to believe that obesity is caused from biological factors alone.[42–44,56] Past research has shown that patients want a professional/medical based approach to treating their obesity, while physicians prefer a patient-led approach.[42,43] Resulting in conflicting views between who is responsible for and how to treat the obesity that creates a situation where physicians are not providing counseling at all to these patients.

The most significant findings from this study reveal that the odds are increased for certain provider characteristics when compared to others. The odds of a patient visit seeing a MD physician receiving diet/nutrition counseling alone is 0.69 times higher than those visits seeing a DO physician. This was an unexpected result since physicians who receive a DO degree tend to be more focused on prevention and holistic issues, while physicians with a MD degree tend to be more focused on treating the symptom and less on prevention. Furthermore, a study looking into the results of obesity counseling curriculum of medical students found that residents who received the curriculum were not more likely to counsel patients when they presented with obesity.[96] While that study did

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not find a difference in the likelihood of providing counseling based on additional training, they did find that those who went through the curriculum provided higher quality counseling when it was provided compared to others who did not receive the training.[96] Therefore, it will take further investigation to find out the exact relationship between the physician degree and likelihood of providing health education counseling.

Additionally, the odds of a patient visit seeing a primary care specialty physician receiving exercise counseling alone is 0.65 times higher than those visits seeing another specialty physician. This was an expected outcome since the USPSTF recommendations are written for physicians in primary care practice. However, studies have shown that obesity complicates the management of other chronic diseases that patients would see a specialist for on a regular basis; thus, specialists should be providing this type of counseling also.[25] Specialists show a high concern for obesity and counseling practices, yet would prefer to refer a patient elsewhere for that counseling.[25] Physicians of all practice specialties should be concerned with the current obesity epidemic. However, until evidence and recommendations are changed to include specialists, obesity counseling should be concentrated mainly in primary care practices.

Previous studies document that there are differing views between physicians and patients on the causes of obesity and who is responsible for addressing the issue. General practitioners tend to believe that obesity does not belong within the medical domain.[43] However, patients tend to have a positive perception of their health care providers which indicates promise for these practitioners to motivate them in behavior change during health care encounters.[56,97] Moreover, research shows that many physicians have negative attitudes and discriminatory intentions towards their patients who are more obese.[72] This

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stems from physician behavior and beliefs that overweight individuals are responsible for their condition and attribute their lack of weight loss to a lack of self-control and lack of cooperation.[72] Yet, previous research suggests that PCPs feel obliged to counsel about the health risks of obesity and ensure goal setting and referrals, but may not feel competent to intervene.[25] These points, among others, could illuminate some of the differences found based on the provider characteristics within this study. One study found that primary care physicians are more likely to counsel on physical activity than on weight reduction or diet/nutrition.[29] Whereas, another study found that physicians counsel more on diet/nutrition and physical activity more than weight reduction.[55] This study did not find a significant difference in the type of counseling provided by primary care physicians. This could be a result of physicians expressing a high concern for the management of obesity, even if they do not always provide the recommended counseling in each visit.[25] Another study found that within obese patient visits, some type of obesity counseling occurred in approximately 24% of the encounters.[45] This study found similar results in that 29.7% of visits included at least one type of obesity counseling. This studies percentage is faintly higher, which could indicate that overtime physicians are providing slightly more counseling to adult obese patients during their health care encounters. Further research is needed to validate this assumption.

While some results from this study on provider characteristics align with previous studies, there is one unique finding that provides new insight into one provider characteristics and the influence on the likelihood of physician's to provide obesity counseling. A previous study found that EMR clinical reminders were significantly associated with counseling provided during a health care visit.[83] Yet, this study found no

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significant association between EMR clinical reminders and the provision of counseling. Unexpectedly, this study did find that regardless of a full EMR or no EMR, the patient was more likely to receive all 3 types of counseling during a visit. This was not expected since literature shows the purpose of EMR to be based on improving patient outcomes and increasing quality of care.[77] It can be explained through a documented source that states EMRs are often times not used in a way that maximizes their potential to improve the quality of care.[84] Thus, this result reveals that EMRs may not have a significant role in increasing care at the point of service but only in other areas. Further research is needed in order to validate this assumption based on the findings from this study.

The strengths of this study include the large sample size from NAMCS. The entire sample aggregated from 2008-2010 of obese patients treated was 11,041. This number was decreased to 9,804 during the logistic regression analysis, which still provides a large sample size for the study. Furthermore, this survey provides a vast amount of information that several conclusions can be drawn from due to the extensiveness of the information collected. There are some limitations within this study. First, this study is based on a survey that is from one patient visit and not representative of an on-going treatment of a patient. Therefore, we are only able to identify patients who are categorized as obese and whether the physician provided the counseling during the visit that was recorded on the encounter form. Second, the NAMCS survey is more accurate for procedure and examination data than for health behavior counseling due to physicians underreporting the counseling they provide.[88] Yet, the NAMCS survey is still considered an accurate tool for measurement of health-related topics contained within the form.[88] Third, we are unable to identify if a patient has been included more than once within this population

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since the data is de-identified. Lastly, the USPSTF recommendation for obese adults has a limitation in regards to the intervals of screening due to the lack of evidence of interval times available in research.[10] While there are some limitations, NAMCS is routinely used to establish national trends that are representative of the population as a whole for many policy-related, health services, and other health-related topics.

While this study provides some new insight into provider characteristics that influence the physician's likelihood to provide counseling in primary care visits, there is still much more research needed to further understand the lack of overall counseling provided to obese patients. First, further research is needed in the area of medical education to see if enhanced health education on counseling skills were offered during training/residency, if this would significantly increase the likelihood of physicians to provide the counseling when needed to obese patients.[51–53,98] Furthermore, enhanced medical education on counseling could also benefit the physicians in practice to increase their confidence, skills, and abilities to address these sensitive patient health topics. Second, further research is needed on physician behavior to find out why physicians provide one type of counseling over another during an encounter.[3] Making physicians aware of this information will aid them in their counseling practices.

There are many barriers present to providing health education counseling to adult, obese patient; yet, it is essential for physicians to use their unique position to address the patient's increased health risks when they come into their practice for care.[12,26,98] It is essential for physicians to be aware of the differences in the provision of obesity counseling based on the factors outlined in this study given the current obesity epidemic. The need to understand, with consistency, what provider characteristics influence the

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provision of obesity counseling, is essential to addressing the epidemic. It is also crucial to ensure physicians are maximizing their counseling efforts with these patients who need to make changes to decrease their risk for other chronic diseases.

CHAPTER 6 CONCLUSION

Of the 11,041 obese patient visits, Manuscripts I and II found that overall between 2008 and 2010, 70.3% had no type of counseling while only 7.6% had all 3 types of recommended counseling provided. Of the 9,804 obese patient visits analyzed further, the odds are increased for the patient to receive all 3 types of health education counseling when: their obesity check box is checked versus unchecked (odds ratio [95%CI]: 0.33 [0.27-0.41] for diet/nutrition; 0.42 [0.33-0.54] for exercise; 0.19 [0.15-0.25] for weight reduction); when they are being seen for a preventive visit versus a new problem visit (odds ratio [95%CI]: 0.42 [0.31-0.56] for diet/nutrition; 0.49 [0.36-0.67] for exercise; 0.46 [0.33-0.65] for weight reduction); when they are being seen for a preventive care visit versus a pre/post-surgery visit (odds ratio [95%CI]: 0.28 [0.17-0.46] for diet/nutrition; 0.46 [0.28-0.76] for exercise; 0.30 [0.16-0.56] for weight reduction); when they are categorized as having Class III obesity versus Class I obesity (odds ratio [95%CI]: 1.38 [1.15-1.67] for diet/nutrition; 1.39 [1.11-1.74] for exercise; 1.59 [1.21-2.09] for weight reduction); and when they are designated as urban versus rural (odds ratio [95%CI]: 0.57 [0.39-0.85] for diet/nutrition; 0.65 [0.43-0.99] for exercise; 0.63 [0.44-0.92] for weight reduction) while controlling for all other variables. Furthermore, the odds are increased for the patient to receive diet/nutrition health education counseling when the visit is conducted by a physician with a MD degree versus a physician with a DO degree (odds ratio [95%CI]: diet/nutrition; 0.69 [0.49-0.97] and when they are seen by a physician with primary care specialty (family medicine, general medicine, internal

medicine, and OBGYN) versus a physician with another specialty (odds ratio [95%CI]: diet/nutrition; 0.65 [0.47-0.88] while controlling for all other variables.

This study found several differences in the provision of health education counseling provided to obese adult patients during primary care visits. There is an overall lack of any type of obesity health education counseling occurring during primary care visits (70.3% of obese patient visits had no counseling provided). Research has shown that patients are highly motivated to lose weight but prefer not want to change their diet in the process.[42] Thus, primary health care providers have a unique opportunity to provide the patient with exercise and/or weight reduction counseling in an effort to address their weight. When looking at the individual types of counseling provided during patient visits, patients were most likely to receive diet/nutrition counseling as opposed to exercise or weight reduction counseling. This would most likely result in the patient's failure to lose weight since they are interested in losing weight but not through diet modifications alone. This low level of counseling could also be attributed to the different views that physicians and the lay population hold in regards to the causes and treatment of obesity. Primary care physicians tend to believe that obesity is caused of behavioral, structural, social, and psychological factors, whereas, the lay population prefers to believe that obesity is caused from biological factors alone.[42–44,56] Past research has shown that patients want a professional/medical based approach to treating their obesity, while physicians prefer a patient-led approach.[42,43] Resulting in conflicting views between who is responsible for and how to treat the obesity that ends with physicians not providing counseling at all to these patients.

The most significant findings from the patient characteristic study reveal that the odds are increased for certain patient characteristics when compared to others. The odds of a patient visit with the obesity check box checked receiving diet/nutrition counseling is 0.33 times higher than those visits with the check box unchecked, 0.42 times higher to receiving exercise counseling, and 0.19 times higher to receiving weight reduction counseling. This outcome would be expected since the physician indicates, through the checking of the box, that they are aware the patient has obesity. The odds of a patient visit for preventive care receiving diet/nutrition counseling is 0.42 times higher than those visits for a new problem, 0.49 times higher to receiving exercise counseling, and 0.65 times higher to receiving weight reduction counseling. This would also be an expected outcome since a preventive care visit has been found to be the most likely type of visit for health education counseling to occur.[29,57] Yet, if the patient is being seen for a new problem that is related to their obesity or high weight, this would not be expected. It would take further investigation to determine the relationship between new problems that arise in obese patient and the provision of health education counseling. Moreover, the odds of a patient visit for preventive care visit receiving diet/nutrition counseling is 0.28 times higher than those visits for pre/post-surgery, 0.46 times higher to receiving exercise counseling, and 0.56 times higher to receiving weight reduction counseling.

Aligning with previous research, the odds of a patient visit with Class III obesity receiving diet/nutrition counseling is 1.38 times higher than those visits with Class I obesity, 1.39 times higher to receiving exercise counseling, and 1.60 times higher to receiving weight reduction. Several studies found that physicians recognize and provide counseling more for patients who have higher BMIs.[25,51,72,73] This study confirms that

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patients with Class III obesity have increased odds of receiving counseling compared to those who are less obese. This result is essential for physicians to be cognizant of because physicians may be able to make more progress in patient's losing weight if they target those with lower BMIs to make life-style modifications before their weight is uncontrollable.[29] Lastly, the odds of a patient visit in an urban location receiving diet/nutrition counseling is 0.57 times higher than those visits in an rural location, 0.65 times higher to receiving exercise counseling, and 0.63 times higher to receiving weight reduction counseling. There is little research available on the differences seen in preventive services provided in urban versus rural primary care practices. However, it has been noted that the practice location (urban versus rural) impacts the physician's adherence, or lack thereof, to preventive services recommendations.[95] Patients in rural locations tend to have less frequent visits to the physician due to the distance between their homes and the practice.[95] This means that physicians should pay extra close attention to their counseling practices in rural areas since those individuals are seen less frequently and have less opportunities to provide the counseling.

Studies have also found that, while still unclear and inconsistent, there is a relationship between patient age and the delivery of counseling. One study found that there appears to be an increasing relationship between age and receiving more counseling until ages 55-65, then it begins to decrease.[51] Resulting in middle aged individuals receiving the most counseling during primary care encounters. The results from this study align with previous findings because counseling was significantly associated with patients aged 45-64, meaning that middle aged patient visits were most likely to receive counseling. However, in regards to weight reduction counseling, patient's aged 18-44

years had increased odds of receiving weight reduction counseling when compared to patient's aged 45-64.This could be a result of physicians addressing weight concerns earlier in life, rather than later, so that the patient's weight is less debilitating which could result in increased quality of life as they age. It would take further research to justify this assumption.

The most significant findings from the provider characteristic study reveal that the odds are increased for certain provider characteristics when compared to others. The odds of a patient visit seeing a MD physician receiving diet/nutrition counseling alone is 0.69 times higher than those visits seeing a DO physician. This was an unexpected result since physicians who receive a DO degree tend to be more focused on prevention and holistic issues, while physicians with a MD degree tend to be more focused on treating the symptom and less on prevention. Furthermore, a study looking into the results of obesity counseling curriculum of medical students found that residents who received the curriculum were not more likely to counsel patients when they presented with obesity.[96] While that study did not find a difference in the likelihood of providing counseling based on additional training, they did find that those who went through the curriculum provided higher quality counseling when it was provided compared to others who did not receive the training.[96] Therefore, it will take further investigation to find out the exact relationship between the physician degree and likelihood of providing health education counseling.

Additionally, the odds of a patient visit seeing a primary care specialty physician receiving exercise counseling alone is 0.65 times higher than those visits seeing another specialty physician. This was an expected outcome since the USPSTF recommendations

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are written for physicians in primary care practice. However, studies have shown that obesity complicates the management of other chronic diseases that patients would see a specialist for on a regular basis so specialists should be providing this type of counseling also.[25] Specialists show a high concern for obesity and counseling practices, yet would prefer to refer a patient elsewhere for that counseling.[25] Physicians of all practice specialty should be concerned with the obesity epidemic. However, until recommendations are changed to include specialists, obesity counseling should be concentrated mainly in primary care practices.

Previous studies document that there are differing views between physicians and patients on the causes of obesity and who is responsible for addressing the issue. General practitioners tend to believe that obesity does not belong within the medical domain.[43] However, patients tend to have a positive perception of their health care providers which indicates promise for these practitioners to motivate them in behavior change during health care encounters.[56,97] Moreover, research shows that many physicians have negative attitudes and discriminatory intentions towards their patients who are more obese.[72] This stems from physician behavior and beliefs that overweight individuals are responsible for their condition and attribute their lack of weight loss to a lack of self-control and lack of cooperation.[72] Yet, previous research suggests that PCPs feel obliged to counsel about the health risks of obesity and ensure goal setting and referrals, but may not feel competent to intervene.[25] These points could illuminate some of the differences found based on the provider characteristics within this study. One study found that primary care physicians are more likely to counsel on physical activity than on weight reduction or diet/nutrition.[29] Whereas, another study found that physicians counsel more on

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diet/nutrition and physical activity more than weight reduction.[55] This study did not find a significant difference in the type of counseling provided by primary care physicians. This could be a result of physicians expressing a high concern for the management of obesity, even if they do not always provide the recommended counseling in each visit.[25] Another study found that within obese patient visits, some type of obesity counseling occurred in approximately 24% of the encounters.[45] This study found similar results in that 29.7% of visits included at least one type of obesity counseling. This studies percentage is faintly higher, which could indicate that overtime physicians are providing slightly more counseling to adult obese patients during their health care encounters. Further research is needed to validate this assumption.

While some results from this study align with previous research findings, there are a couple of unique results that provide new insight into some patient characteristics and their influence on physician's provision of obesity counseling. Some studies have found that there is no significant difference in the odds of receiving health education counseling overall.[18] Yet, this study found several differences in the odds of receiving counseling based on patient characteristics (obesity check box, preventive care visit, Class III obesity, and urban location). These differences could mean that these patient characteristics have begun to influence the likelihood of physicians to provide counseling to obese patients during primary health care encounters. Thus, physicians will need to pay close attention to these patient characteristics to ensure they are providing adequate counseling to all adult obese patients. Additionally, a previous study found that the more time spent with physicians during a visit increased the likelihood of receiving obesity counseling when compared to those who spent less time.[74] Yet this study found no

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significance in the time spent with the physician on the delivery of obesity counseling. Since obesity counseling only takes 3-5 minutes to provide during a patient visit it would seem that all patient visits, regardless of time spent with the physician, could receive this recommended counseling.[17,47]Overall, there has not been a significant change in physician's provision of health education counseling to adult obese patient since 2008 even with the rise in awareness and focus on obesity within the US.

Moreover, while some results from this study on provider characteristics align with previous studies, there is one unique finding that provides new insight into one provider characteristics and the influence on the likelihood of physician's to provide obesity counseling. A previous study found that EMR clinical reminders were significantly associated with counseling provided during a health care visit.[83] Yet, this study found no significant association between EMR clinical reminders and the provision of counseling. Unexpectedly, this study did find that regardless of a full EMR or no EMR, the patient was more likely to receive all 3 types of counseling during a visit. This was not expected since literature shows the purpose of EMR to be based on improving patient outcomes and increasing quality of care.[77] It can be explained through a documented source that states EMRs are often times not used in a way that maximizes their potential to improve the quality of care.[84] Thus, this result reveals that EMRs may not have a significant role in increasing care at the point of service but only in other areas. Further research is needed in order to validate this assumption based on the findings from this study.

The strengths of this study include the large sample size from NAMCS. The entire sample aggregated from 2008-2010 of obese patients treated was 11,041. This number

was decreased to 9,804 during the logistic regression analysis, which still provides a large sample size for the study. Furthermore, this survey provides a vast amount of information that several conclusions can be drawn from due to the extensiveness of the information collected. There are some limitations within this study. First, this study is based on a survey that is from one patient visit and not representative of an on-going treatment of a patient. Therefore, we are only able to identify patients who are categorized as obese and whether they received counseling during the visit that was recorded on the encounter form. Second, NAMCS has been found to be more accurate for procedure and examination data than for health behavior counseling data due to underreporting issues.[88] Yet, the NAMCS survey is still considered an accurate tool for measurement of the health-related topics contained within the form.[88] Third, we are unable to identify if a patient has been included more than once within this population since the data is de-identified. Lastly, the USPSTF recommendation for obese adults has a limitation in regards to the intervals of screening due to the lack of evidence of interval times in research studies.[10] While there are some limitations, NAMCS is routinely used to establish national trends that are representative of the population as a whole for many policy-related, health services, and other health-related topics.

While this study provides some new insight into patient and provider characteristics that influence the physician's likelihood to provide counseling in a primary care visit, there is still more research needed to further understand the lack of counseling that occurs. First, further research is needed in the area of the USPSTF recommendations on the time intervals of the health education counseling for adult obese patients. This would allow the recommendations to be more specific in the duration and

interval times that the counseling must occur to be most beneficial to the patient. Second, it is important to determine what patient characteristics impacts the types of counseling the physician decides to provide the most during a visit.[3,10] Likewise, investigation into the type of counseling that has the greatest benefit to the patient is needed so that physicians can focus on the type most likely to bring about life-style modifications and weight loss. Third, it is essential for research to investigate the differences found in the provision of counseling based on the obesity check box status, preventive care visits, the patient's class of obesity, and the urban versus rural location of the visit. Fourth, further research is needed in the area of medical education to see if enhanced health education counseling skills were offered during training, if this would significantly increase the likelihood of physicians to provide the counseling when needed to patients.[51–53,98] Furthermore, enhanced medical education on counseling could also benefit the physicians in practice to increase their confidence, skills, and abilities to address these sensitive patient health topics. fifth, further research is needed on physician behavior to find out why physicians provide one type of counseling over another during an encounter.[3]

Although physicians see a vast amount of adult obese patients within primary care practice, health education counseling practices by primary care physicians remains less than optimal. Therefore, there is a drastic need to improve this type of health education counseling by primary care physicians in order to address the current obesity epidemic in the U.S. Given the current epidemic and the limited time available during primary care visits, the need to understand, with consistency, what patient and provider characteristics influence the provision of obesity counseling is vital for physicians. This will ensure physicians are maximizing their counseling efforts during their encounters. There are

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many barriers present to providing health education counseling to adult, obese patient; yet, it is essential for physicians to use their unique position to address the patient's increased health risks when they come into their practice for care.[12,26,98] It is also crucial to ensure physicians are maximizing their counseling efforts with these patients who need to make changes to decrease their risk for other chronic diseases.

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APPENDIX A – 2008 NAMCS QUESTIONNAIRE

1. PATIENT INFORMATION

a. Date of visit
Month | Day | Year
2 0 0

b. ZIP Code

c. Date of birth
Month | Day | Year

d. Sex
1 ☐ Female   2 ☐ Male

e. Ethnicity
1 ☐ Hispanic or Latino
2 ☐ Not Hispanic or Latino

f. Race – Mark (X) one or more.
1 ☐ White
2 ☐ Black/African American
3 ☐ Asian
4 ☐ Native Hawaiian/Other Pacific Islander
5 ☐ American Indian/Alaska Native

g. Expected source(s) of payment for this visit – Mark (X) all that apply.
1 ☐ Private Insurance
2 ☐ Medicare
3 ☐ Medicaid/SCHIP
4 ☐ Worker's compensation
5 ☐ Self-pay
6 ☐ No charge/Charity
7 ☐ Other
8 ☐ Unknown

h. Tobacco use
1 ☐ Not current   3 ☐ Unknown
2 ☐ Current

2. INJURY/POISONING/ADVERSE EFFECT

Is this visit related to any of the following?
1 ☐ Unintentional injury/poisoning
2 ☐ Intentional injury/poisoning
3 ☐ Injury/poisoning – unknown intent
4 ☐ Adverse effect of medical/surgical care or adverse effect of medicinal drug
5 ☐ None of the above

3. REASON FOR VISIT

Patient's complaint(s), symptom(s), or other reason(s) for this visit – Use patient's own words.
(1) Most important:
(2) Other:
(3) Other:

4. CONTINUITY OF CARE

a. Are you the patient's primary care physician/provider?
1 ☐ Yes –SKIP to item 4b.
2 ☐ No
3 ☐ Unknown

Was patient referred for this visit?
1 ☐ Yes
2 ☐ No
3 ☐ Unknown

b. Has the patient been seen in your practice before?
1 ☐ Yes, established patient – How many past visits in the last 12 months? Exclude this visit.
☐ Visits
1 ☐ Unknown
2 ☐ No, new patient

c. Major reason for this visit
1 ☐ New problem (<3 mos. onset)
2 ☐ Chronic problem, routine
3 ☐ Chronic problem, flare-up
4 ☐ Pre-/Post-surgery
5 ☐ Preventive care (e.g., routine prenatal, well-baby, screening, insurance, general exams)

5. PROVIDER'S DIAGNOSIS FOR THIS VISIT

a. As specifically as possible, list diagnoses related to this visit including chronic conditions.
(1) Primary diagnosis:
(2) Other:
(3) Other:

b. Regardless of the diagnoses written in 5a, does the patient now have – Mark (X) all that apply.
1 ☐ Arthritis
2 ☐ Asthma
3 ☐ Cancer
0 ☐ In situ
1 ☐ Local
2 ☐ Regional
3 ☐ Distant
4 ☐ Unknown
4 ☐ Cerebrovascular disease
5 ☐ CHF
6 ☐ Chronic renal failure
7 ☐ COPD
8 ☐ Depression
9 ☐ Diabetes
10 ☐ Hyperlipidemia
11 ☐ Hypertension
12 ☐ Ischemic heart disease
13 ☐ Obesity
14 ☐ Osteoporosis
15 ☐ None of the above – SKIP to item 6

c. Status of patient enrollment in a disease management program for any of the conditions marked in 5b.
1 ☐ Currently enrolled
2 ☐ Ordered/Advised to enroll at this visit
3 ☐ Not enrolled
4 ☐ Unknown

6. VITAL SIGNS

(1) Height
☐ ft ☐ in   OR   ☐ cm

(2) Weight
☐ lb ☐ oz
OR
☐ kg ☐ gm

(3) Temperature
☐ °C
☐ °F

(4) Blood pressure
Systolic / Diastolic

7. DIAGNOSTIC/SCREENING SERVICES

Mark (X) all ordered or provided at this visit.
1 ☐ NONE

Examinations:
2 ☐ Breast
3 ☐ Pelvic
4 ☐ Rectal
5 ☐ Skin
6 ☐ Depression screening

Imaging:
7 ☐ X-ray
8 ☐ Bone mineral density
9 ☐ CT scan
10 ☐ Echocardiogram
11 ☐ Other ultrasound
12 ☐ Mammography
13 ☐ MRI
14 ☐ PET scan
15 ☐ Other imaging

Blood tests:
16 ☐ CBC (complete blood count)
17 ☐ Electrolytes
18 ☐ Glucose
19 ☐ HgbA1C (glycohemoglobin)
20 ☐ Lipids/Cholesterol
21 ☐ PSA (prostate specific antigen)
22 ☐ Other blood test

Scope:
23 ☐ Scope procedure (e.g., colonoscopy) - Specify

Other tests:
24 ☐ Biopsy – Specify site
25 ☐ Chlamydia test
26 ☐ EKG/ECG
27 ☐ HPV DNA test
28 ☐ Pap test - conventional
29 ☐ Pap test - liquid-based
30 ☐ Pap test - unspecified
31 ☐ Pregnancy test
32 ☐ Spirometry/Pulmonary function test
33 ☐ Urinalysis (UA)
34 ☐ Other exam/test/service - Specify

8. HEALTH EDUCATION

Mark (X) all ordered or provided at this visit.
1 ☐ NONE
2 ☐ Asthma education
3 ☐ Diet/Nutrition
4 ☐ Exercise
5 ☐ Growth/Development
6 ☐ Injury prevention
7 ☐ Stress management
8 ☐ Tobacco use/Exposure
9 ☐ Weight reduction
10 ☐ Other

9. NON-MEDICATION TREATMENT

Mark (X) all ordered or provided at this visit.
1 ☐ NONE
2 ☐ Complementary alternative medicine (CAM)
3 ☐ Durable medical equipment
4 ☐ Home health care
5 ☐ Hospice care
6 ☐ Physical therapy
7 ☐ Radiation therapy
8 ☐ Speech/Occupational therapy
9 ☐ Psychotherapy
10 ☐ Other mental health counseling
11 ☐ Excision of tissue
12 ☐ Orthopedic care
13 ☐ Wound care

Procedures:
14 ☐ Other non-surgical procedures – Specify
15 ☐ Other surgical procedures – Specify

10. MEDICATIONS & IMMUNIZATIONS

☐ NONE
Include Rx and OTC drugs, immunizations, allergy shots, anesthetics, chemotherapy, and dietary supplements that were ordered, supplied, administered or continued during the visit.

	New	Continued
(1)	1 ☐	2 ☐
(2)	1 ☐	2 ☐
(3)	1 ☐	2 ☐
(4)	1 ☐	2 ☐
(5)	1 ☐	2 ☐
(6)	1 ☐	2 ☐
(7)	1 ☐	2 ☐
(8)	1 ☐	2 ☐

11. PROVIDERS

Mark (X) all providers seen at this visit.
1 ☐ Physician
2 ☐ Physician assistant
3 ☐ Nurse practitioner/Midwife
4 ☐ RN/LPN
5 ☐ Mental health provider
6 ☐ Other

13. TIME SPENT WITH PROVIDER

Minutes — Enter zero if no provider seen

12. VISIT DISPOSITION

Mark (X) all that apply.
1 ☐ No show
2 ☐ Left without being seen
3 ☐ No follow-up planned
4 ☐ Return if needed, PRN
5 ☐ Refer to other physician
6 ☐ Return at specified time
7 ☐ Telephone follow-up planned
8 ☐ Refer to emergency department
9 ☐ Admit to hospital
10 ☐ Other

NAMCS-30 (9-12-2007)

2008 NAMCS

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APPENDIX B – 2009 NAMCS QUESTIONNAIRE

1. PATIENT INFORMATION

a. Date of visit

Month	Day	Year
		0

b. ZIP Code

c. Date of birth

Month	Day	Year

d. Sex
1 ☐ Female   2 ☐ Male

e. Ethnicity
1 ☐ Hispanic or Latino
2 ☐ Not Hispanic or Latino

f. Race – *Mark (X) one or more.*
1 ☐ White
2 ☐ Black or African American
3 ☐ Asian
4 ☐ Native Hawaiian or Other Pacific Islander
5 ☐ American Indian or Alaska Native

g. Expected source(s) of payment for this visit – *Mark (X) all that apply.*
1 ☐ Private Insurance
2 ☐ Medicare
3 ☐ Medicaid/SCHIP
4 ☐ Worker's compensation
5 ☐ Self-pay
6 ☐ No charge/Charity
7 ☐ Other
8 ☐ Unknown

h. Tobacco use
1 ☐ Not current   3 ☐ Unknown
2 ☐ Current

2. INJURY/POISONING/ADVERSE EFFECT

Is this visit related to any of the following?
1 ☐ Unintentional injury/poisoning
2 ☐ Intentional injury/poisoning
3 ☐ Injury/poisoning – unknown intent
4 ☐ Adverse effect of medical/surgical care or adverse effect of medicinal drug
5 ☐ None of the above

3. REASON FOR VISIT

Patient's complaint(s), symptom(s), or other reason(s) for this visit – *Use patient's own words.*

(1) Most important:

(2) Other:

(3) Other:

4. CONTINUITY OF CARE

a. Are you the patient's primary care physician/provider?
1 ☐ Yes –*SKIP to item 4b.*
2 ☐ No
3 ☐ Unknown

Was patient referred for this visit?
1 ☐ Yes
2 ☐ No
3 ☐ Unknown

b. Has the patient been seen in your practice before?
1 ☐ Yes, established patient – **How many past visits in the last 12 months?** *Exclude this visit.*
☐ Visits
1 ☐ Unknown
2 ☐ No, new patient

c. Major reason for this visit
1 ☐ New problem (<3 mos. onset)
2 ☐ Chronic problem, routine
3 ☐ Chronic problem, flare-up
4 ☐ Pre/Post surgery
5 ☐ Preventive care (e.g., routine prenatal, well-baby, screening, insurance, general exams)

5. PROVIDER'S DIAGNOSIS FOR THIS VISIT

a. As specifically as possible, list diagnoses related to this visit including chronic conditions.

(1) Primary diagnosis:

(2) Other:

(3) Other:

b. Regardless of the diagnoses written in 5a, does the patient now have – *Mark (X) all that apply.*
1 ☐ Arthritis
2 ☐ Asthma
3 ☐ Cancer
4 ☐ Cerebrovascular disease
5 ☐ Chronic renal failure
6 ☐ Congestive heart failure
7 ☐ COPD
8 ☐ Depression
9 ☐ Diabetes
10 ☐ Hyperlipidemia
11 ☐ Hypertension
12 ☐ Ischemic heart disease
13 ☐ Obesity
14 ☐ Osteoporosis
15 ☐ None of the above

6. VITAL SIGNS

(1) Height
☐ ft ☐ in   OR   ☐ cm

(2) Weight
☐ lb ☐ oz   OR   ☐ kg ☐ gm

(3) Temperature
☐ °C   ☐ °F

(4) Blood pressure
Systolic / Diastolic

7. DIAGNOSTIC/SCREENING SERVICES

Mark (X) all ordered or provided at this visit.
1 ☐ NONE

Examinations:
2 ☐ Breast
3 ☐ Foot
4 ☐ Pelvic
5 ☐ Rectal
6 ☐ Retinal
7 ☐ Skin
8 ☐ Depression screening

Imaging:
9 ☐ X-ray
10 ☐ Bone mineral density
11 ☐ CT scan
12 ☐ Echocardiogram
13 ☐ Other ultrasound
14 ☐ Mammography
15 ☐ MRI
16 ☐ Other imaging

Blood tests:
17 ☐ CBC (complete blood count)
18 ☐ Glucose
19 ☐ HgbA1c (glycohemoglobin)
20 ☐ Lipids/Cholesterol
21 ☐ PSA (prostate specific antigen)
22 ☐ Other blood test

Scope:
23 ☐ Scope procedure (e.g., colonoscopy) - *Specify*

Other tests:
24 ☐ Biopsy – *Specify site*
25 ☐ Chlamydia test
26 ☐ EKG/ECG
27 ☐ HIV test
28 ☐ HPV DNA test
29 ☐ Pap test - conventional
30 ☐ Pap test - liquid-based
31 ☐ Pap test - unspecified
32 ☐ Pregnancy test
33 ☐ Urinalysis (UA)
34 ☐ Other exam/test/service - *Specify*

8. HEALTH EDUCATION

Mark (X) all ordered or provided at this visit.
1 ☐ NONE
2 ☐ Asthma education
3 ☐ Diet/Nutrition
4 ☐ Exercise
5 ☐ Family planning/Contraception
6 ☐ Growth/Development
7 ☐ Injury prevention
8 ☐ Stress management
9 ☐ Tobacco use/Exposure
10 ☐ Weight reduction
11 ☐ Other

9. NON-MEDICATION TREATMENT

Mark (X) all ordered or provided at this visit.
1 ☐ NONE
2 ☐ Complementary alternative medicine (CAM)
3 ☐ Durable medical equipment
4 ☐ Home health care
5 ☐ Physical therapy
6 ☐ Speech/Occupational therapy
7 ☐ Psychotherapy
8 ☐ Other mental health counseling
9 ☐ Excision of tissue
10 ☐ Wound care
11 ☐ Cast
12 ☐ Splint or wrap

Procedures:
13 ☐ Other non-surgical procedures – *Specify*
14 ☐ Other surgical procedures – *Specify*

10. MEDICATIONS & IMMUNIZATIONS

☐ NONE

Include Rx and OTC drugs, immunizations, allergy shots, oxygen, anesthetics, chemotherapy, and dietary supplements that were ordered, supplied, administered or continued during this visit.

	New	Continued
(1)	1 ☐	2 ☐
(2)	1 ☐	2 ☐
(3)	1 ☐	2 ☐
(4)	1 ☐	2 ☐
(5)	1 ☐	2 ☐
(6)	1 ☐	2 ☐
(7)	1 ☐	2 ☐
(8)	1 ☐	2 ☐

11. PROVIDERS

Mark (X) all providers seen at this visit.
1 ☐ Physician
2 ☐ Physician assistant
3 ☐ Nurse practitioner/Midwife
4 ☐ RN/LPN
5 ☐ Mental health provider
6 ☐ Other

12. VISIT DISPOSITION

Mark (X) all that apply.
1 ☐ No show/Left without being seen
2 ☐ Refer to other physician
3 ☐ Return at specified time
4 ☐ Refer to ER/Admit to hospital
5 ☐ Other

13. TIME SPENT WITH PROVIDER

Minutes — *Enter zero if no provider seen*

NAMCS-30 (9-29-2008)

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APPENDIX C – 2010 NAMCS QUESTIONNAIRE

1. PATIENT INFORMATION

a. Date of visit
Month | Day | Year

b. ZIP Code

c. Date of birth
Month | Day | Year

d. Sex
1 ☐ Female   2 ☐ Male

e. Ethnicity
1 ☐ Hispanic or Latino
2 ☐ Not Hispanic or Latino

f. Race – Mark (X) one or more.
1 ☐ White
2 ☐ Black or African American
3 ☐ Asian
4 ☐ Native Hawaiian or Other Pacific Islander
5 ☐ American Indian or Alaska Native

g. Expected source(s) of payment for this visit – Mark (X) all that apply.
1 ☐ Private insurance
2 ☐ Medicare
3 ☐ Medicaid or CHIP/SCHIP
4 ☐ Worker's compensation
5 ☐ Self-pay
6 ☐ No charge/Charity
7 ☐ Other
8 ☐ Unknown

h. Tobacco use
1 ☐ Not current   3 ☐ Unknown
2 ☐ Current

2. INJURY/POISONING/ADVERSE EFFECT

Is this visit related to any of the following?
1 ☐ Unintentional injury/poisoning
2 ☐ Intentional injury/poisoning
3 ☐ Injury/poisoning – unknown intent
4 ☐ Adverse effect of medical/surgical care or adverse effect of medicinal drug
5 ☐ None of the above

3. REASON FOR VISIT

Patient's complaint(s), symptom(s), or other reason(s) for this visit – Use patient's own words.
(1) Most important:
(2) Other:
(3) Other:

4. CONTINUITY OF CARE

a. Are you the patient's primary care physician/provider?
1 ☐ Yes –SKIP to item 4b.
2 ☐ No
3 ☐ Unknown

Was patient referred for this visit?
1 ☐ Yes
2 ☐ No
3 ☐ Unknown

b. Has the patient been seen in your practice before?
1 ☐ Yes, established patient – How many past visits in the last 12 months? Exclude this visit.
_____ Visits
1 ☐ Unknown
2 ☐ No, new patient

c. Major reason for this visit
1 ☐ New problem (<3 mos. onset)
2 ☐ Chronic problem, routine
3 ☐ Chronic problem, flare-up
4 ☐ Pre/Post surgery
5 ☐ Preventive care (e.g., routine prenatal, well-baby, screening, insurance, general exams)

5. PROVIDER'S DIAGNOSIS FOR THIS VISIT

a. As specifically as possible, list diagnoses related to this visit including chronic conditions.
(1) Primary diagnosis:
(2) Other:
(3) Other:

b. Regardless of the diagnoses written in 5a, does the patient now have – Mark (X) all that apply.
1 ☐ Arthritis
2 ☐ Asthma
3 ☐ Cancer
0 ☐ In situ
1 ☐ stage I
2 ☐ stage II
3 ☐ stage III
4 ☐ stage IV
5 ☐ Unknown stage
4 ☐ Cerebrovascular disease
5 ☐ Chronic renal failure
6 ☐ Congestive heart failure
7 ☐ COPD
8 ☐ Depression
9 ☐ Diabetes
10 ☐ Hyperlipidemia
11 ☐ Hypertension
12 ☐ Ischemic heart disease
13 ☐ Obesity
14 ☐ Osteoporosis
15 ☐ None of the above

6. VITAL SIGNS

(1) Height _____ ft _____ in OR _____ cm
(2) Weight _____ lb _____ oz OR _____ kg _____ gm
(3) Temperature _____ ☐ °C ☐ °F
(4) Blood pressure Systolic / Diastolic

7. DIAGNOSTIC/SCREENING SERVICES

Mark (X) all ordered or provided at this visit.
1 ☐ NONE

Examinations:
2 ☐ Breast
3 ☐ Foot
4 ☐ Pelvic
5 ☐ Rectal
6 ☐ Retinal
7 ☐ Skin
8 ☐ Depression screening

Imaging:
9 ☐ X-ray
10 ☐ Bone mineral density
11 ☐ CT scan
12 ☐ Echocardiogram
13 ☐ Other ultrasound
14 ☐ Mammography
15 ☐ MRI
16 ☐ Other imaging

Blood tests:
17 ☐ CBC (complete blood count)
18 ☐ Glucose
19 ☐ HgbA1c (glycohemoglobin)
20 ☐ Lipids/Cholesterol
21 ☐ PSA (prostate specific antigen)
22 ☐ Other blood test

Scope:
23 ☐ Scope procedure (e.g., colonoscopy) - Specify

Other tests:
24 ☐ Biopsy – Specify site
25 ☐ Chlamydia test
26 ☐ EKG/ECG
27 ☐ HIV test
28 ☐ HPV DNA test
29 ☐ Pap test - conventional
30 ☐ Pap test - liquid-based
31 ☐ Pap test - unspecified
32 ☐ Pregnancy/HCG test
33 ☐ Urinalysis (UA)
34 ☐ Other exam/test/service - Specify

8. HEALTH EDUCATION

Mark (X) all ordered or provided at this visit.
1 ☐ NONE
2 ☐ Asthma education
3 ☐ Diet/Nutrition
4 ☐ Exercise
5 ☐ Family planning/Contraception
6 ☐ Growth/Development
7 ☐ Injury prevention
8 ☐ Stress management
9 ☐ Tobacco use/Exposure
10 ☐ Weight reduction
11 ☐ Other

9. NON-MEDICATION TREATMENT

Mark (X) all ordered or provided at this visit.
1 ☐ NONE
2 ☐ Complementary alternative medicine (CAM)
3 ☐ Durable medical equipment
4 ☐ Home health care
5 ☐ Physical therapy
6 ☐ Radiation therapy
7 ☐ Speech/Occupational therapy
8 ☐ Psychotherapy
9 ☐ Other mental health counseling
10 ☐ Excision of tissue
11 ☐ Wound care
12 ☐ Cast
13 ☐ Splint or wrap

Procedures:
14 ☐ Other non-surgical procedures – Specify
15 ☐ Other surgical procedures – Specify

10. MEDICATIONS & IMMUNIZATIONS

☐ NONE

Include Rx and OTC drugs, immunizations, allergy shots, oxygen, anesthetics, chemotherapy, and dietary supplements that were ordered, supplied, administered or continued during this visit.

New | Continued
(1) _____ 1 ☐ 2 ☐
(2) _____ 1 ☐ 2 ☐
(3) _____ 1 ☐ 2 ☐
(4) _____ 1 ☐ 2 ☐
(5) _____ 1 ☐ 2 ☐
(6) _____ 1 ☐ 2 ☐
(7) _____ 1 ☐ 2 ☐
(8) _____ 1 ☐ 2 ☐

11. PROVIDERS

Mark (X) all providers seen at this visit.
1 ☐ Physician
2 ☐ Physician assistant
3 ☐ Nurse practitioner/Midwife
4 ☐ RN/LPN
5 ☐ Mental health provider
6 ☐ Other

13. TIME SPENT WITH PROVIDER

Minutes _____ Enter zero if no provider seen

12. VISIT DISPOSITION

Mark (X) all that apply.
1 ☐ Refer to other physician
2 ☐ Return at specified time
3 ☐ Refer to ER/Admit to hospital
4 ☐ Other

NAMCS-30A (10-15-2009)

NAMCS-30