2015

Physician Assistants' Preventive Medicine Practices and Related Habits, Attitudes, and Beliefs

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This is to certify that the doctoral dissertation by

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Walden University
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Abstract

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MPH, Walden University, 2007

BS, University of Arizona, 2001

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Public Health

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Abstract

Physician assistants play a pivotal role in expanding access to care, yet research on their preventive medicine practices is limited. Guided by Lewis's conceptual model for predicting counseling practices, this cross-sectional study examined the relationship between physician assistants' preventive medicine practices, personal health habits, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services. A 104-item self-administered survey was used to collect data from 314 physician assistants attending the American Academy of Physician Assistants' 42nd Annual Conference. Data were analyzed using descriptive statistics, Pearson's correlation, and stepwise multiple regression. Results indicated that physician assistants engaged in preventive medicine activities about half the time, believed it was very important to counsel patients on prevention topics, felt they were somewhat effective in changing patient behaviors, and reported that barriers were somewhat important in hindering preventive care delivery. Significant and predictive relationships between physician assistants' health habits, attitudes, perceived barriers, and practices were found. These findings may guide researchers, providers, policymakers, and the public in making informed and comprehensive health care decisions. This study contributes to social change by serving as a baseline for the creation of effective strategies for physician assistant practice and self-assessment. Additionally, data from this study can be used to advocate changes in the education, training, and certification of physician assistants, as well as foster medicine and public health collaborations.

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Dedication

To my mother, Judia Rebekah Malachi-Jones and late grandmother, Marion Malachi. The two women whose unconditional love, wisdom, praise, encouragement, support, patience, and sacrifice provided me with an environment in which I could learn, grow, and mature.

Acknowledgments

To God be the Glory! It is by His Grace and Mercy that I have made it this far. I am thankful, blessed, highly favored, and know without a shadow of a doubt, I can do all things through Christ who strengthens me!

No task, big or small, is met alone. God, in His infinite wisdom, places people along our path to encourage, guide, and support our endeavors. As I look back on this experience, I am grateful to my family, friends, classmates, professors, and colleagues who have, in their way, contributed to my success. My journey would not have been the same without you; thank you!

To my mother, Judia Rebekah Malachi-Jones, thank you for all you have done for me over the years. Your wisdom, support, and prayers are constant reminders of your love for me. You are an exemplary example of an overcomer—no matter life's challenges, you have remained positive, prayerful, and have pressed on; I am blessed to be your daughter! To my father, Laval Lev Malachi, thank you for your love, prayers, guidance, and dedicated service to our country. To my father, Nathaniel Jones III, thank you for always wanting the best for me and for ensuring my computers operated in tip-top shape! To my brothers, Mario, Laval, Nate, and Chris; sister, Levette, and sister-in-laws, T'Pring, Miranda, and Trina, thank you for your love and encouragement. To my nieces, nephews, and Godchildren. Stay focused in school, work hard, accept failure as a part of success, have fun, and do something nice for someone else, just because—I guarantee you will succeed in life! To my aunt, Arlinda Everage and Godmother, Mary Farmer, thank you for encouraging my pursuits. To Tonia Turner and Brenda Wright,

thank you for the support over the years. To the best group of friends anyone could ever ask for: Ada Marie Ware-Richardson, Rhonda A. Carroll, Rashandah Zakkiyyah Scipio Butler, Jenessa Johnson, Latoya Ellis, Samantha Glanton, Kayilu Nadia Kosberg, Coressa Britt, Alisha Harris, and Tiesha Davis. Thank you for your friendship, sisterhood, trust, support, encouragement, and all the fun moments—I am inspired by each of you!

To Patricia Isennock, MS, BSN, MCHES, you are the best mentor a student could ever have. Over the years, I have learned so much from you—thank you for sharing your knowledge, expertise, and experience. I appreciate your support, encouragement, and vote of confidence. I am glad to call you my friend and colleague. To Dr. Antonio Baines, thank you for the words of wisdom when I first entertained the idea of earning a Ph.D. You were right; the process was challenging at times, but in the end, it was worth it! To James Kielek, PA-C; Johnna Tanner, PA-C, and Chibuike Anokwute, MD, thank you for your medical expertise and guidance. More importantly, thank you for your service to your patients, students, and community.

To Mark Yeazel, MD, MPH, thank you for dusting off, what you called, "ancient analyses" to answer my questions regarding the PMAAQ—your time is greatly appreciated. To the Physician Assistant Education Association, thank you for access to the PA Program Directory. To the Agency for Healthcare Research and Quality, thank you for assisting providers and empowering patients through the dissemination of evidence-based research and resources. To the American Academy of Physician Assistants, thank you for allowing me to conduct my study during your 42nd Annual Conference. Moreover, to the 320 physician assistants who were kind enough to

participate in this groundbreaking study—thank you, thank you, thank you! Without your contribution, this project would not have been possible.

To Laerd Statistics, thank you for simplifying SPSS. To Paul Lai and Dr. Annie Pezalla, thank you for your editorial guidance. To my wonderfully amazing dissertation committee: Chair, Dr. Richard Palmer; Methodologist, Dr. Jeff Snodgrass, and University Research Reviewer, Dr. James Rohrer. I extend to you my sincere gratitude. Thank you for your time, expertise, and direction throughout this process—I am forever grateful!

Lastly, to the scholar-practitioners currently enrolled in a doctoral program and those entertaining the idea. The decision to earn a doctorate is one that should not be taken lightly. The journey is not designed to be easy, and it certainly is not for the weak. The dissertation process in itself is arduous and designed to "test" your resolve, ability to think and write critically, defend your position in a scholarly tone, and persevere to the very end, despite life's many challenges. Once you understand and accept the process for what it is, you will be able to forge ahead. Nevertheless, there will be times you will question your decision and find yourself on the verge of giving up—don't! Always keep in mind the reason *why* you embarked upon this journey in the first place; it will help you remain focused. Think about the social change contributions you will make and the people who will benefit from your hard work, tears, and sacrifice. As my grandmother would say, "It's not who started, but who finishes to the end!" I encourage you to remain steadfast in your pursuit, finish to the end, and be the change agent you were meant to be. The light at the end of the tunnel does exist and is waiting for you. Be blessed!

—Dr. Judia Yael Malachi

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Chapter 1: Introduction to the Study

Introduction

The purpose of this study was to examine the relationship between physician assistants' preventive medicine practices, personal health habits, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services. Physician assistants are expected to provide health promotion and disease prevention; however, their health habits, attitudes, and beliefs may influence their medical practices. Research suggests practitioner advice has been effective in reducing excessive alcohol consumption, encouraging tobacco cessation, and the modification of some diet- and activity-related cardiovascular risk factors (Carlson, Maynard, Fulton, Hootman, & Yoon, 2009; Dunn, Hammond, & Roberts, 2009; Galuska, Will, Serdula, & Ford, 1999; Hunt, Kristal, White, Lynch, & Fries, 1995; Pipe, Sorensen, & Reid, 2009; Pool et al., 2013; Smith et al., 2011; Whitlock, Orleans, Pender, & Allan, 2002). Additionally, the literature suggests practitioners who have positive attitudes toward prevention and counseling, believe they are effective at modifying patient behaviors, and engage in healthy activities themselves are more apt to implement preventive services in their practice of medicine (Bellas, Asch, & Wilkes, 2000; Dunn et al., 2009; Howe et al., 2010; Laws et al., 2009; Oberg & Frank, 2009; Pipe et al., 2009).

Although physician assistants have practiced medicine in the United States for over 45 years, little is known about their preventive medicine practices, personal health habits, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services. In order to better understand this population and fulfill a

research need, this study examined the relationship between the preventive medicine practices, health habits, attitudes, and beliefs of physician assistants.

Chapter 1 provides background information on the importance of health promotion and disease prevention in clinical practice and the barriers that hinder the delivery of such services. Additionally, the problem and purpose statements describe the study topic, explain why the study was conducted, and highlight social change implications. Lastly, the study's research questions and hypotheses, conceptual framework, assumptions, and limitations are discussed.

Background

Chronic diseases—such as diabetes, arthritis, cancer, heart disease, and stroke—are the major source of illness, hospitalization, disability, and death in the United States (Centers for Disease Control and Prevention [CDC], 2012; Clarke, 2010). Despite being among the most preventable of all health problems in the United States, nearly 50% of Americans have at least one chronic condition, and 7 out of 10 deaths among Americans each year are attributed to chronic diseases (CDC, 2012). Furthermore, many of the risk factors associated with chronic diseases—tobacco use, insufficient physical activity, unhealthy diet and nutrition, and excessive alcohol consumption—are not only responsible for illness, suffering, disability, and premature death, but are also preventable and modifiable (CDC, 2012; Myers, 2009; World Health Organization [WHO], 2013).

The integration of prevention—by way of primary, secondary, and tertiary interventions into clinical practice—has been cited to reduce morbidity, mortality, and impaired functioning (Dalle Grave et al., 2010; Mokdad, Marks, Stroup, & Gerberding, 2004; Moquaddam, Salmin, & Al-Jeheidli, 2007; WHO, 2013). Health care practitioners,

including physician assistants, have the unique opportunity to mitigate preventable health problems. Their position as front-line providers enables them to assess risk factors, suggest behavioral modification, recommend preventive services, and prescribe appropriate chemoprophylaxis early in the spectrum of care (U.S. Preventive Services Task Force [USPSTF], 1996; Whitlock et al., 2002). By incorporating prevention strategies, practitioners are able to assist in the protection, promotion, and maintenance of health and wellbeing, as well as the prevention of disease, disability, and premature death (The American Board of Preventive Medicine [ABoPM], 2011).

Patients consider medical professionals important and viable sources of health information (Delnevo, Steinberg, Abatemarco, & Hausman, 2003; Frank, Wright, Serdula, Elon, & Baldwin, 2002; Pool et al., 2013; Smith et al., 2011; Sobal, Valente, Munchie, Levine, & DeForge, 1985) and expect them to engage in healthy behaviors and activities (Hash, Munna, Vogel, & Bason, 2002; Price, Desmond, & Losh, 1991). Additionally, patients are more likely to adhere to healthy behaviors when encouraged by their health care provider (Greenlund et al., 2002; Hash et al., 2002; Lewis, Wells, & Ware, 1986; Pool et al., 2013; Töyry et al., 2000). However, they cite the lack of awareness and lack of recommendation from their practitioners as main barriers to obtaining preventive services (Dunlop, Jack, & Frey, 2007; Johnson, Nichol, & Lipczynski, 2008; Yeazel, Bremer, & Center, 2006). Similarly, practitioners believe they are undeniably responsible for promoting healthy behavior (Kolasa & Rickett, 2010; Ma, Urizar, Alehegn, & Stafford, 2004) and counseling patients about lifestyle modification (Delnevo et al., 2003; Kolasa & Rickett, 2010); nevertheless, research indicates they provide such services at suboptimal rates (Gelly, Mentre, Nougairede, & Duval, 2013;

Laws et al., 2009; Shires et al., 2012; Yarnall, Pollak, Østbye, Krause, & Michener, 2003;Yeazel et al., 2006).

Even though practitioners believe they have a responsibility to counsel their patients on healthy lifestyles (Kolasa & Rickett, 2010; Laws et al., 2009; Ma et al., 2004), they often cite various barriers to preventive care delivery; including lack of time, insufficient reimbursement, low patient interest, uncertainty about what preventive services to provide, lack of self-confidence, and inadequate clinician training (Carlson et al., 2009; Kolasa & Rickett, 2010; Oscós-Sánchez et al., 2008; Pool et al., 2013; Shires et al., 2012; Whitlock et al., 2002; Woolf, 2008; Yarnall et al., 2003;Yeazel et al., 2006).

These findings suggest the delivery of preventive care is complex and multifactorial. Exploring factors such as personal and professional characteristics, prevention and counseling attitudes, personal health habits, and perceived barriers to preventive care delivery may describe preventive medicine practices and facilitate further research on ways practitioners can implement health promotion and disease prevention strategies into their delivery of care.

According to Reed and Selleck (1996), nonphysician health care providers are more likely than physicians to use health promotion and disease prevention strategies in their practice of medicine. As a fast growing sector and integral part of the U.S. health care delivery system, physician assistants are in a unique position to create relationships with their patients, promote health promotion and disease prevention, mitigate preventable health issues, and aid in behavioral modification (Flocke, Crabtree, & Stange, 2007; O'Connor & Hooker, 2007; Reed & Selleck, 1996); therefore it is important to understand their preventive medicine practices. Because there is limited

research available that investigates the preventive medicine practices of physician assistants, it is unclear if, when, and to what extent physician assistants incorporate health promotion and disease prevention in their practice of medicine. Additionally, there is no existing research that examines physician assistants' personal health habits, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services. Thus, findings from this study not only fill a crucial research gap, but also answer questions about the health habits, attitudes, beliefs, and counseling practices of physician assistants.

Problem Statement

This study addressed the lack of research on the relationship between physician assistants' preventive medicine practices, health habits, attitudes, and beliefs. Despite the increased use of physician assistants over the last 45 years, there remains a gap in literature on both the delivery of preventive services facilitated by physician assistants, as well as how their preventive medicine practices are influenced by their personal health habits, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services.

As more physicians enter specialty areas, there will be an increased need for nonphysician health care providers, such as physician assistants (Bureau of Labor Statistics [BoLS], 2012). Therefore, given the paucity of research on physician assistants, additional research is needed in order to better understand them, and their roles in the delivery of health promotion and disease prevention in clinical settings.

Purpose Statement

The purpose of this quantitative, cross-sectional survey study was to examine the relationship between physician assistants' preventive medicine practices, personal health habits, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services. A secondary objective was to suggest a conceptual framework for predicting the counseling practices of physician assistants.

Research Questions and Hypotheses

This study investigated the habits, attitudes, beliefs, and practices of physician assistants. Specifically, the study aimed to understand the relationship between physician assistants' preventive medicine practices, personal health habits, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services. The following research questions were addressed:

Research Question 1: Is there a relationship between physician assistants' personal health habits (body mass index, tobacco use, alcohol consumption, diet, physical activity, and regular source of care) and their preventive medicine practices?

H_1: There is a significant relationship between physician assistants' personal health habits and their preventive medicine practices.

H_{01}: There is no significant relationship between physician assistants' personal health habits, as measured by The Summary of Diabetes Self-Care Activities Diet (SDSCA) scale, The Cardiologists' Lifestyle Survey, and Regular Source of Care instruments, and their preventive medicine practices, as measured by the behaviors scale of the Preventive Medicine Attitudes and Activities Questionnaire (PMAAQ) instrument.

Research Question 2: Is there a relationship between physician assistants' prevention and counseling attitudes (perceived importance of, effectiveness of, and comfort in delivering preventive care) and their preventive medicine practices?

H_2: There is a significant relationship between physician assistants' prevention and counseling attitudes and their preventive medicine practices.

H_{02}: There is no significant relationship between physician assistants' prevention and counseling attitudes, as measured by the attitudes scale of the PMAAQ instrument, and their preventive medicine practices, as measured by the behaviors scale of the PMAAQ instrument.

Research Question 3: Is there a relationship between physician assistants' perceived barriers to the delivery of clinical preventive services and their preventive medicine practices?

H_3: There is a significant relationship between physician assistants' perceived barriers to the delivery of clinical preventive services and their preventive medicine practices.

H_{03}: There is no significant relationship between physician assistants' perceived barriers to the delivery of clinical preventive services, as measured by the barriers scale of the PMAAQ instrument, and their preventive medicine practices, as measured by the behaviors scale of the PMAAQ instrument.

Research Question 4: Is there a relationship between physician assistants' personal health habits (body mass index, tobacco use, alcohol consumption, diet, physical activity, and regular source of care) and their prevention and counseling attitudes (perceived importance of, effectiveness of, and comfort in delivering preventive care)?

H_4: There is a significant relationship between physician assistants' personal health habits and their prevention and counseling attitudes.

H_{04}: There is no significant relationship between physician assistants' personal health habits, as measured by the SDSCA scale, The Cardiologists' Lifestyle Survey, and Regular Source of Care instruments, and their prevention and counseling attitudes, as measured by the attitudes scale of the PMAAQ instrument.

Research Question 5: Is there a relationship between physician assistants' perceived barriers to the delivery of clinical preventive services and their prevention and counseling attitudes (perceived importance of, effectiveness of, and comfort in delivering preventive care)?

H_5: There is a significant relationship between physician assistants' perceived barriers to the delivery of clinical preventive services and their prevention and counseling attitudes.

H_{05}: There is no significant relationship between physician assistants' perceived barriers to the delivery of clinical preventive services, as measured by the barriers scale of the PMAAQ instrument, and their prevention and counseling attitudes, as measured by the attitudes scale of the PMAAQ instrument.

Conceptual Framework

This study was guided by a conceptual framework developed based on Lewis's model for predicting the counseling practices of physicians (Lewis et al., 1986). In this model, physician counseling practices are influenced by attitudinal variables; personal beliefs, attitudes, and health habits; clinical and specialty training, and the financing system (Lewis et al., 1986). Counseling practices are defined by whom the physician

counsels, when and how often they counsel, and the techniques used to implement the counseling. Lewis's model will be discussed in detail in Chapter 2.

For this study, a model for predicting the preventive medicine practices of physician assistants was proposed. In this model (Figure 1), physician assistants' preventive medicine practices, defined by the "collective actions designed to affect patients' health-related behaviors" (Lewis et al., 1986, p. 14), are influenced by personal health habits, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services. Prevention and counseling attitudes, expressed by the "perceived importance of, effectiveness of, and comfort in delivering preventive care" (Yeazel et al., 2006, p. 90), are directly influenced by both personal health habits and perceived barriers to the delivery of clinical preventive services. Personal health habits, which are influenced by prevention and counseling attitudes, are defined as any activity that impacts the physician assistants' health (i.e., body mass index, tobacco use, alcohol consumption, diet, physical activity, and regular source of care). Lastly, perceived barriers are defined as any factor that impedes the delivery of clinical preventive services (e.g., lack of time or insufficient training in health promotion and disease prevention).

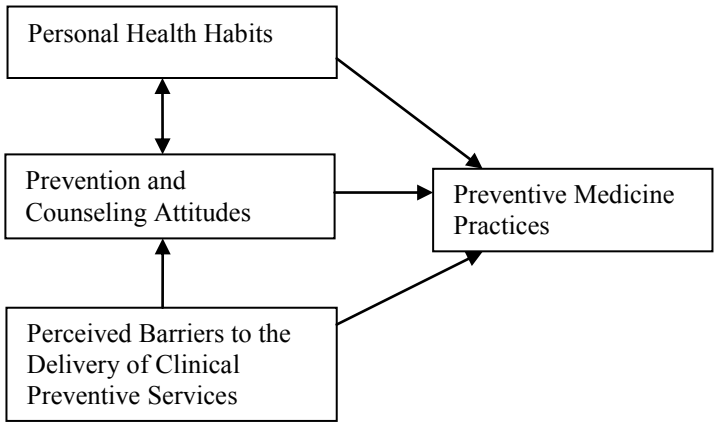

Figure 1. Proposed model for predicting the preventive medicine practices of physician assistants.

The conceptual framework for this study suggests personal health habits and perceived barriers to the delivery of clinical preventive services impact prevention and counseling attitudes, as well as preventive medicine practices, and prevention and counseling attitudes impact both personal health habits and preventive medicine practices. Since there are no published models that explain the preventive medicine practices of physician assistants, the proposed model in Figure 1 was tested using a research instrument that measured the variables within the model. The instrument is described in Chapter 3.

Nature of the Study

The aim of this study was threefold. First, to determine the relationship between physician assistants' personal health habits, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services (independent-predictor variables) and their preventive medicine practices (dependent-outcome variable). Second,

to determine the relationship between physician assistants' personal health habits and perceived barriers to the delivery of clinical preventive services (independent-predictor variables) and their prevention and counseling attitudes (dependent-outcome variable), and third, to predict physician assistants' counseling practices.

This study used a cross-sectional, group-administered research design and surveyed licensed physician assistants attending the American Academy of Physician Assistants (AAPA) 42nd Annual Conference in Boston, Massachusetts, May 24–28, 2014. Although medical professionals have some of the lowest response rates (Cook, Dickinson, & Eccles, 2009; Flanigan, McFarlane, & Cook, 2008; Glidewell et al., 2012), group-administered cross-sectional surveys provide an easy and convenient option for researchers who wish to gather data on this population. Furthermore, the survey method provided the opportunity to describe the population under study, answer secondary research questions, and test certain hypotheses (Bowling, 2002).

The data collected from the surveys were analyzed using IBM SPSS Statistics 21, a statistical software package used for managing and analyzing data. Analysis included descriptive analysis to describe the sample and inferential analysis to address the research questions and test the hypotheses.

Operational Definitions

Disease prevention: Measures used to prevent the occurrence of disease, hinder its progress, or reduce its effects once established (WHO, 1984).

Health promotion: The core function of public health aimed at "enabling people to increase control over, and to improve, their health" (WHO, 1986, p. 1). In essence, health promotion is expected to encourage healthier lifestyles.

Prevention: Anticipatory action taken to prevent or minimize the occurrence of an event (Turnock, 2004). According to Moquaddam et al. (2007), there are three types of prevention: primary (aimed at deterring the occurrence of a disease), secondary (assists in the early detection of disease), and tertiary (attempts to mitigate adverse effects of existing conditions).

Preventive care/medicine/services: Any medication, procedure, or service that promotes and maintains health and/or contributes to the reduction of risk factors that result in disease or injury (Moquaddam et al., 2007).

Preventive medicine practices: The "collective actions designed to affect patients' health-related behaviors" (Lewis et al., 1986, p. 14).

Assumptions

Due to the nature of the profession, it was assumed that physician assistants incorporate some form of health promotion and disease prevention into their practice. Additionally, despite behaviors being self-reported, it was assumed that the study participants would provide truthful answers to survey questions.

Scope and Delimitations

This research study was delimited to licensed physician assistants attending the AAPA 42nd Annual Conference in Boston, Massachusetts, May 24–28, 2014. Although all physician assistant attendees who agreed to participate were invited to answer questions pertaining to their personal health habits and personal and professional characteristics, only physician assistants who were actively managing adult patients were invited to answer questions about their preventive medicine practices, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services.

Limitations

A limitation of this research study was the use of a cross-sectional design. Although this design provides the opportunity to describe the population under study and provides some indication of the relationship between independent variables and the dependent variable, it is not useful in establishing a causal relationship or explaining changes over time. Additionally, because this design relies on the self-reporting behaviors of physician assistants, recall bias was possible (Ewing, Selassie, Lopez, & McCutcheon, 1999). Likewise, because the study used a group-administered survey, participants may have felt their anonymity was threatened by the presence of the researcher, and therefore did not express their true feelings and opinions.

Furthermore, because the study was delimited to licensed physician assistants attending the AAPA 42nd Annual Conference who actively managed adult patients, generalizations of the study results are limited to this population. Furthermore, because the findings only pertain to physician assistants, it does not explain the preventive medicine practices of physicians or nonphysician health care providers, such as nurse practitioners.

Significance of the Study

Patients rely on their practitioners for reliable health information (Delnevo et al., 2003; Frank et al., 2002; Pool et al., 2013; Smith et al., 2011; Sobal et al., 1985), and practitioners are cited as believing they are responsible for providing such information (Kolasa & Rickett, 2010; Laws et al., 2009; Ma et al., 2004). Due to the nature of the profession, physician assistants are uniquely presented with opportunities to forge relationships with their patients and aid in their behavioral modification.

Health promotion and disease prevention are activities that cross the medicine–public health bridge. Consequently, practitioners can no longer be effective in providing care to their patients without implementing prevention strategies into their practice. Increasing the emphasis on prevention allows the health care clinician to identify risk factors for disease, suggest behavioral change, recommend preventive services, and prescribe appropriate chemoprevention methods early in the spectrum of care (USPSTF, 1996).

Understanding the habits, attitudes, and beliefs of physician assistants, as well as the factors that influence their delivery of preventive care, will not only encourage professional development and curriculum changes in physician assistant training programs, but also help guide researchers, health professionals, policymakers, and the U.S. public in making informed and comprehensive decisions. Furthermore, physician assistants may be persuaded to maintain a healthy lifestyle, not only because it is necessary for their own personal health, but because it may extend well into their preventive medicine practices, making them more effective at improving patient outcomes.

Implications for Social Change

Physician assistants and patients agree that discussing health behaviors is important not only during wellness visits, but also during routine patient care visits (Flocke et al., 2007). Therefore, the results of this study have the potential to effect social change by closing a research gap; elucidating the habits, attitudes, and beliefs of physician assistants; explaining their practice patterns; and illustrating how various factors might influence the delivery of preventive services. Furthermore, because

physician assistants are the frontline providers to many Americans seeking health care services and they have unique opportunities to encourage behavioral change over a course of time (Flocke et al., 2007; O'Connor & Hooker, 2007); data from this study may serve as a baseline for creating effective interventions for physician assistant health promotion and disease prevention practices and self-assessment.

Summary

Chapter 1 presented an overview of the study and demonstrated the importance of implementing prevention into clinical settings. Chapter 2 provides a detailed summary of the literature that supports the need for this study. The research design, data collection methods, and statistical analysis used to answer the study's research questions and test hypotheses are addressed in Chapter 3. Chapter 4 details the study's research findings, including results from the pilot study. Lastly, Chapter 5 discusses the findings, recommendations for further research, and social change implications.

Chapter 2: Review of Literature

Introduction

There is considerable discussion in the literature on the importance of integrating health promotion and disease prevention in clinical settings, as well as physician attitudes and self-reported delivery of clinical preventive services. Although physician assistants are a large and growing portion of the primary care workforce (Hooker, 2006; Hooker & Berlin, 2002; Shaheen et al., 2000) and have become established and well-received in the U.S. health care delivery system (Baldwin et al., 1998; Fang, 2012; Hooker, Cipher, & Sekscenski, 2005; Roblin, Becker, Adams, Howard, & Roberts, 2004), very little is known about their preventive medicine practices. In addition, most published articles and dissertations studying physician assistants are either outdated or focused on physician assistant education, growth of the profession, cost effectiveness, patient satisfaction, or the care they provide (Cawley & Hooker, 2003; Coplan et al., 2013; Hooker, 2009; Hooker & Everett, 2011; Hooker et al., 2005; Strunk, 1973). To date, there are no published articles or dissertation studies that focus solely on the factors that influence the preventive medicine practices of physician assistants. Likewise, there are no published studies on the relationship between physician assistants' preventive medicine practices, personal health habits, prevention counseling attitudes, and perceived barriers to the delivery of clinical preventive services. Therefore, the aim of this study was to provide an understanding about this relationship and answer questions about the habits, attitudes, beliefs, and counseling practices of physician assistants.

Guided by an inquiry into the physician assistant's role in preventive care delivery, Chapter 2 includes an overview of the conceptual framework which drives this

study, followed by an examination of the U.S. health care delivery system, including Titles IV and V of the Patient Protection and Affordable Care Act, history of the physician assistant profession, training and certification, competencies, scope of practice, patient satisfaction, and effectiveness. Furthermore, the review of literature will consider the factors influencing preventive care practices, specifically personal health habits, attitudinal variables (attitudes and beliefs about the perceived importance of, effectiveness of, and comfort in delivering preventive care), and perceived barriers to delivering preventive services. Finally, a summary of the chapter and future chapters will be presented.

Literature Search Strategy

The literature reviewed in this section contains both primary and secondary sources retrieved from various scholarly databases including, Academic Search Complete/Premier, CINAHL Plus with Full text, Health & Medical Complete, Health Sciences: A SAGE Full Text Collection, MEDLINE with full text, SocINDEX with Full Text, and Science Direct. A set of keywords were created in order to locate relevant material through the use of Walden University's academic library databases. The keywords *primary care, physician, physician assistant, nonphysician/midlevel provider, nurse practitioner, training and education, public health, health promotion, disease prevention, practice patterns, health habits, counseling attitudes and beliefs, U.S. health care delivery system, collaboration, patient satisfaction, provider effectiveness, integration, medicine, competencies, and preventive care/services/medicine* were combined in various ways and used to guide the search. Additional searches using the above keywords were conducted using Google Scholar.

Conceptual Framework

This study was guided by a proposed model for predicting the preventive medicine practices of physician assistants (see Figure 1). The model was developed using Lewis's model for predicting the counseling practices of physicians (Figure 2; Lewis et al., 1986). In Lewis's model, physician counseling practices are influenced by attitudinal variables, such as motivation and perceived skills and barriers; personal health habits, beliefs, and attitudes; clinical and specialty training; and the financing system (Lewis et al., 1986).

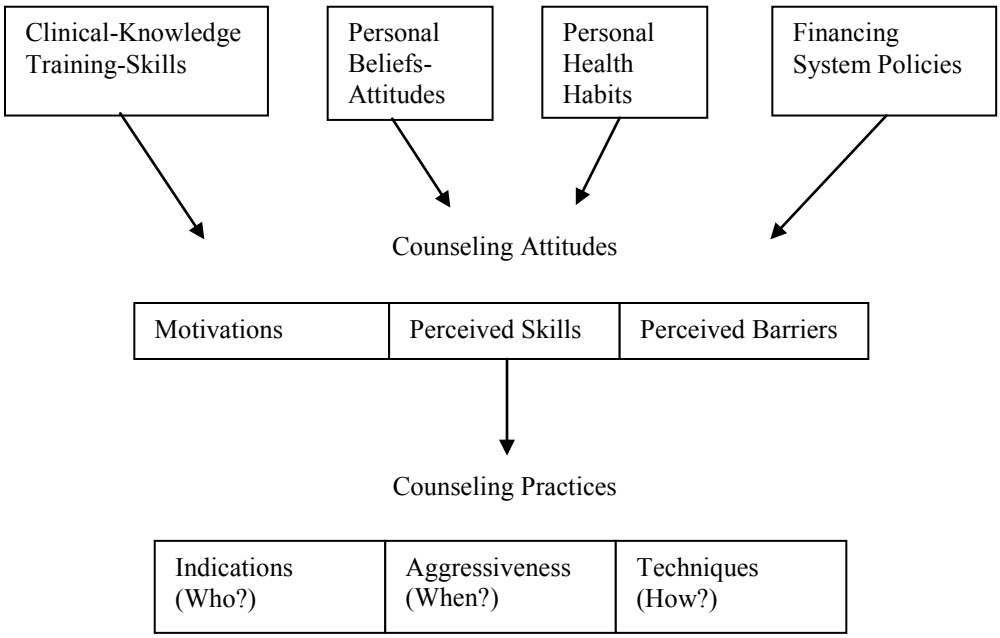

Figure 2. From "A model for predicting the counseling practices of physicians," by Lewis, C., Wells, K., & Ware, J., 1986, *Journal of General Internal Medicine*, 1(Jan/Feb), p. 15. Copyright 1986 by Springer. Reprinted with permission.

Counseling practices are defined by whom the physician counsels (indication), when and how often they counsel (aggressiveness), and the techniques used to implement the counseling (Lewis et al., 1986). Additionally, physician counseling practices are influenced by counseling attitudes (motivations, perceived skills, and perceived barriers), which are influenced by clinical knowledge, training and skills, personal beliefs and attitudes, personal health habits, and the financing system policies (Lewis et al., 1986). Because each of these counseling behaviors can be applied across all disease prevention and health promotion activities, counseling practices are related to the physicians' clinical knowledge, motivation and beliefs, patient risk factors, and effective techniques to modify patient behavior (Lewis et al., 1986).

In order to measure the variables in the model, Lewis et al. used an instrument consisting of questions pertaining to the personal health habits, attitudes toward counseling, and self-reported counseling practices of physicians. The questionnaire was distributed to a random sample of 50% of all eligible members of a western county medical society (n = 201), and 76% (n = 151) completed the survey (Lewis et al., 1986). Of the respondents, 15% smoked, 58% thought they did not exercise enough, and 24% consumed alcohol every day (Lewis et al., 1986).

Survey questions related to personal health habits were adapted from the Rand Health Insurance Study's Medical History Questionnaire. For each habit, researchers collected data on the level of the habit (i.e., smoking pack years, exercise frequency, height and weight, and alcohol consumption), whether the physician thought the level was appropriate (e.g., "Do you think you are overweight?") and whether the physician

was currently or had attempted to improve the habit (e.g., “Are you trying to cut down on your drinking?”; p. 15).

Researchers found significant associations between physicians’ characteristics, personal health habits, and attitudes (predictor variables), and their counseling practices (outcome variable; Lewis et al., 1986). Specialty was the biggest indicator. Surgeons and obstetrician-gynecologists counseled fewer patients, less intensively, and used fewer techniques than did internists or general and family physicians (Lewis et al., 1986). Physicians did not fully counsel on those habits in which they themselves had poor practices; however, those who were actively trying to improve their habits counseled significantly more than those who were not trying (Lewis et al., 1986). About 35% of the variance in counseling practices was explained by physicians’ attitudes, health habits, and specialty (Lewis et al., 1986). Additionally, these variables were equally important in predicting counseling behavior (Lewis et al., 1986).

To assess physicians’ motivation and attitudes toward counseling about smoking, Lewis et al. (1986) used 40 items to measure counseling motivation, perceived counseling skills, and perceived barriers to counseling. Furthermore, to determine the counseling practices (indication, aggressiveness, and technique) of four major health habits (smoking, weight control, exercise, and alcohol consumption), Lewis et al. used a separate set of items. For the attitudinal scale (motivations, skills, and barriers) and the counseling scale (indications, aggressiveness, and techniques), the psychometric properties were excellent (Lewis et al., 1986). Cronbach’s alpha test was used to measure internal reliability for the attitudinal scales and techniques scale; the result ranged from 0.70 to 0.83. Likewise, Guttman’s scalogram analysis of the indications and

aggressiveness revealed high reproducibility (ranging from 0.93 to 0.99) and high scalability (ranging from 0.72 to 0.97; Lewis et al., 1986).

The vast majority of physicians surveyed agreed that counseling is important and that physicians have an obligation to counsel (Lewis et al., 1986). However, with regards to smoking counseling, only 12% felt they were effective at counseling and 21% indicated they knew how to counsel. Seventy-four percent of the physicians agreed that they knew how to interview patients, and 65–69% felt that smoking counseling was difficult and time consuming. There was variety in opinion with regards to payment for counseling services (Lewis et al., 1986). Exploring physician indications, more than half of the physicians reported that they counsel all patients about weight, alcohol, and smoking. Furthermore, 22–34% of the group reported only counseling patients who already have a disease linked to a specific habit, 14–39% did not discuss lifestyle factors with any of their cardiac and pulmonary disease patients, and only 26.6% said they discussed exercise with all patients who have poor health habits (Lewis et al., 1986).

With regard to aggressiveness, about half (44–55%) of the physician group said they counseled their patients for less than 2 minutes for all health habits except weight (Lewis et al., 1986). Depending on the habit, 6.8 to 13.4% of the respondents said they never counseled their patients, regardless of their health status (Lewis et al., 1986).

Physicians employed various techniques when counseling their patients. Nearly all reported discussing the risks and benefits of behavior modification (Lewis et al., 1986); almost half said they suggested specific changes, while somewhat fewer stated they explored patients' feelings or suggested habits. Lastly, discussions with family

members or agency referral were mostly reported with alcohol abuse, whereas pamphlets were the most common technique used in weight counseling (Lewis et al., 1986).

Although the authors of the study noted several limitations with the data presented (i.e., self-reported assessments from a 50% random sample of one medical society, unable to generalize findings, higher prevalence of habits associated with increased risk of disease in the study population than reported by others), the instruments used have excellent psychometric properties, therefore suggesting they are appropriate to use in other studies (Lewis et al., 1986).

Patients look to their health care provider for health-related advice and counseling (Delnevo et al., 2003; Frank et al., 2002; Pool et al., 2013; Smith et al., 2011; Sobal et al., 1985). The data presented suggest that they receive it more often and more effectively from practitioners who adhere to the behaviors they advocate (Greenlund et al., 2002; Lewis et al., 1986; Oberg & Frank, 2009; Pool et al., 2013; Töyry et al., 2000). Though the study conducted by Lewis et al. was on physicians, it may also provide a glimpse into the practices of physician assistants.

Because physician assistants are trained in the medical model and work under the auspices of a physician, they may share similar characteristics, health habits, attitudes, and beliefs; however, there is no published data that supports or dispels this claim. For this reason, the conceptual framework for this study, as discussed in Chapter 1, speculates physician assistants' preventive medicine practices, defined by the "collective actions designed to affect patients' health-related behaviors" (Lewis et al., 1986, p. 14), are related to personal health habits, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services. Prevention and counseling

attitudes, expressed by the "perceived importance of, effectiveness of, and comfort in delivering preventive care" (Yeazel et al., 2006, p. 90), are directly influenced by both personal health habits and perceived barriers to the delivery of clinical preventive services. Personal health habits, which are influenced by prevention and counseling attitudes, are defined as any activity that impacts the physician assistants' health (i.e., tobacco use, alcohol consumption, diet, physical activity, and regular source of care). Lastly, perceived barriers are defined as any factor that impedes the delivery of clinical preventive services (e.g., lack of time or insufficient training in health promotion and disease prevention).

Therefore, the proposed model in this study suggests that personal health habits and perceived barriers to the delivery of clinical preventive services impact prevention and counseling attitudes, as well as preventive medicine practices, and prevention and counseling attitudes impact both personal health habits and preventive medicine practices (see Figure 1).

Since there is no published framework that explains the preventive medicine practices of physician assistants, this study tested the model using a research instrument that measures the variables within the model. Details about the study instrument will be discussed in Chapter 3.

The U.S. Health Care Delivery System

For centuries mankind has been actively concerned with disease and curing disease, as well as with health and the multifaceted conditions of health (Liburd & Sniezek, 2007). In ancient times, physicians swore by Greek gods Aesculapius, the god of medicine, and his daughter Hygeia, the goddess of good health, cleanliness, and

sanitation—in essence, public health (Nelson, 2004). Today, the medical profession has continued to use Aesculapius' medical model, while Hygeia's public health model seems to have faded from the consciousness of medicine (Nelson, 2004). Despite the historical roots of patient health and population health being inextricably connected, medicine and public health are now perplexingly divided.

The historical relationship between medicine and public health illustrates a notable example of what sociologists and philosophers call a demarcation problem or boundary issue (Brandt & Gardner, 2000). That is, an issue that involves the division of institutional, intellectual, theoretical, and practical aspects between two fundamentally related fields (Brandt & Gardner, 2000).

Medicine and public health, although mutually dependent and interrelated, are depicted as dichotomous (Brandt & Gardner, 2000). Medicine is commonly committed to cure and has historically been associated with caring for and treating individuals, whereas public health has focused its attention on health promotion and disease prevention and is committed to the health of entire populations (Harvard School of Public Health, 2013). Increasingly, however, the U.S. public, health professionals, and policymakers are realizing the important role health promotion and disease prevention play in the prevention of chronic and infectious diseases, health disparities, access to care, and the impact of behavior and lifestyle choices (Allan et al., 2004; Clarke, 2010; Frieden, 2010; Khoury et al., 2011).

The Institute of Medicine (IOM, 1988) defined public health as, "what we as a society do collectively to assure the conditions for people to be healthy" (p. 19). Sadly, however, the incidence of chronic and preventable diseases in the United States continues

to rise. Among seven countries surveyed (Australia, Canada, Germany, the Netherlands, New Zealand, the United Kingdom, and the United States), the United States ranked last on outcome indicators of infant mortality and mortality amendable to health care, and second-to-last on healthy life expectancy (Davis, Schoen, & Stremikis, 2010). Furthermore, people with chronic conditions receive fewer services, experience greater morbidity and worse health outcomes, and are less likely to receive preventive and screening services (Gornick, Eggers, & Riley, 2001; Owens et al., 2008; Schoen, Osborn, How, Doty, & Peugh, 2008).

Experts agree the health care delivery system and public health system are in need of great improvement (Majette, 2011). In 2010, the IOM asserted health improvement in the United States requires a shift from the medical model toward "an ecologic, population-based approach" (p. 88). Additionally, Clarke (2010) emphasized the need for a transition from a culture of "sick care" to a "culture of prevention" (p. S-10). Moreover, Katz and Ali (2009) recommended prevention be "incorporated into the practice of all physicians and other health care professionals" (p. 6).

The Patient Protection and Affordable Care Act

On March 23, 2010, President Barack Obama signed into law H.R. 3590—better known as the Patient Protection and Affordable Care Act (PPACA)—a federal statute that reforms health care legislation. The PPACA consists of nine titles, each attending to a vital component of health reform (Democratic Policy Committee [DPC], 2009, p. 1). However, for the purpose of this literature review, the focus will be on Title IV: Prevention of Chronic Disease and Improving Public Health and Title V: Health Care Workforce.

Title IV: Prevention of chronic disease and improving public health. As discussed previously, chronic diseases are responsible for much of the illness, hospitalization, disability, and death in the United States (CDC, 2012; Clarke 2010). Preventive services—such as screening, counseling, and preventive medications—have been shown to reduce morbidity and mortality rates caused by these debilitating conditions (Dalle Grave et al., 2010; Moquaddam et al., 2007; WHO, 2013).

Title IV of the PPACA includes provisions aimed at preventing chronic diseases and improving public health by (a) modernizing disease prevention and public health systems, (b) increasing access to clinical preventive services, (c) creating healthier communities, and (d) supporting prevention and public health innovation (Mueller, 2010). Specifically, Title IV is intended to reduce barriers, increase access, and encourage prevention and health promotion.

Title V: Health care workforce. Patients and health care practitioners alike believe the role of health care providers include being knowledgeable about, and a viable source of, health information (Delnevo et al., 2003; Frank et al., 2002; Kolasa & Rickett, 2010; Ma et al., 2004; Pool et al., 2013; Smith et al., 2011; Sobal et al., 1985). Unfortunately, several studies (Costanza et al., 1992; Shires et al., 2012; Yeazel et al., 2006; Whitlock et al., 2002) have demonstrated patients did not receive recommended preventive services, and practitioners missed important opportunities to provide such services (Baron et al., 2010; Mirand, Beehler, Kuo, & Mahoney, 2003; Schmittdiel et al., 2011; Vadaparampil et al., 2011; Wong, Taylor, Wright, Opel, & Katzenellenbogen, 2013).

Title V of the PPACA supplies specific provisions aimed at (a) creating innovations in the health care workforce, (b) increasing the supply of the health care workforce, (c) enhancing health care workforce education and training, (d) supporting the existing health care workforce, (e) strengthening primary care and other workforce improvements, and (f) improving access to health care services (Mueller, 2010). In essence, Title V was developed to provide additional support for educating and training health care workers (Cawley, 2008; Kocher, Emanuel, & DeParle, 2010), as well as expand the number of primary care practitioners who will implement clinical prevention and population health (Cawley, 2008; Zenzano et al., 2011).

Despite the increased use of physician assistants in primary care specialties (Cawley, 2008; Hooker, 2006; Hooker & Berlin, 2002; Hooker & McCaig, 2001; Mittman, Cawley, & Fenn, 2002; O'Connor & Hooker, 2007), much of the research available on the delivery of preventive services is on physicians, nurses, and nurse practitioners. As an integral member of the multidisciplinary medical team and an important resource to patients and communities, it is important that the U.S. public, health professionals, and policymakers realize the potential impact physician assistants have on the health outcomes of this nation.

Research indicates that until prevention is fully integrated into all aspects of health care, progress will be elusive (Allan et al., 2004) and the health of many Americans will continue to hang by a feeble thread. Although there is much controversy surrounding the PPACA, it is the first of its kind to comprehensively include provisions focusing on prevention, wellness, and public health (Majette, 2011). Furthermore, it

creates an atmosphere for health professionals, including physician assistants, to actively engage in health promotion and disease prevention strategies within clinical settings.

History of the Physician Assistant Profession

The origins of the physician assistant profession date back to the 17th century with the use of *Feldshers*, who provided primary care in rural areas of Russia under the auspices of physicians (Cawley & Hooker, 2003; Mittman et al., 2002). Still to this day, Feldshers provide care to individuals living in Russia (Cawley & Hooker, 2003; Kenyon, 1985). Additionally, in the early 1960s, China trained *barefoot doctors* to improve upon the delivery of health care services that were once exclusively the domain of physicians (Blendon, 1979). Today, barefoot doctors serve as the initial point of contact for patients seeking primary care services in China (Cawley & Hooker, 2003).

With the enactment of Medicare and Medicaid during the mid-1960s, health and health care issues were gaining increased attention (Carter & Gifford, 1982). More doctors were transitioning to specialty areas of medicine, creating an unequal distribution of primary care physicians. Additionally, there was a dire need to increase access to care in rural and underserved areas/populations (Cawley, 1996; Mittman et al., 2002). This situation, coupled with the advent of the Health Professions Assistance Act of 1963, created a rich environment for the physician assistant profession to thrive (Hooker, 2009).

In 1965, based on the knowledge of the fast-track training of physicians during World War II, Eugene Stead, MD created the first physician assistant program at Duke University (Atwater, Bednar, Hassman, & Khouri, 2008). The first trainees were Navy corpsmen returning from Vietnam who, although highly experienced in medical care, were not qualified to practice in the civilian sector due to lack of formal training (Atwater

et al., 2008). Women were not initially selected because they were considered to have unsuitable career orientation (Stead, 1966) and insufficient "temporal and geographic flexibility" (Estes, 1968, p. 1084).

Since its inception, the profession has come a long way. As of the 2010 AAPA Census, there were more than 83,000 nationally certified physician assistants, and in 2012, there were about 86,500 (AAPA, 2013). Additionally, the gender demographics of the profession have changed greatly. In 1972, 20% of physician assistants were women (Scheffler & Stinson, 1974); today, 67% of the workforce is women (AAPA, 2014).

Training and Certification

Physician assistants are trained in a model that closely resembles that which is taught in medical school (AAPA, 2011a, 2011b; Hedges, 2005; PA Focus, 2014); however, they are educated and credentialed with a primary care focus (Cawley, 2008; PA Focus, 2014). The curriculum, an average of 27 months in duration, prepares physician assistants to work as part of a physician-led team and is designed to provide a broad range of knowledge in medical principles with a strong focus on clinical applicability (AAPA, 2011a; PA Focus, 2014). The curriculum includes didactic coursework in anatomy, physiology, biochemistry, pharmacology, behavioral sciences, and physical diagnosis, as well as more than 2000 hours of supervised clinical clerkships in inpatient and outpatient settings in family medicine, internal medicine, pediatrics, obstetrics and gynecology, general surgery, emergency medicine, and psychiatry (AAPA, 2011a; Atwater et al., 2008; PA Focus, 2014). Prior to entering a program, students complete approximately 2 years of undergraduate prerequisite coursework in English,

math, biology, chemistry, anatomy, physiology, and behavioral sciences (AAPA, 2011a; Atwater et al., 2008).

As of summer 2014, there were 187 accredited physician assistant programs and 15 developing programs in the United States (see Appendix A; Physician Assistant Education Association [PAEA], 2014). Although all accredited programs meet the same rigorous educational standards, there is flexibility in the program structure, degree offerings, tuition, and duration (AAPA, 2011a). Regardless of the degree awarded (certificate, associates, bachelors, or masters), students must successfully pass the Physician Assistant National Certifying Examination administered by the National Commission on Certifying of Physician Assistants (AAPA, 2011b; Henry, Hooker, & Yates, 2011) in order to attain the PA-C designation (Atwater et al., 2008) and practice (AAPA, 2011b).

Physician assistants are licensed by the state in which they practice (Atwater et al., 2008; Henry et al., 2011). Additionally, because they are members of a physician-led team, their license is directly tied to their supervising physician (Atwater et al., 2008). Once licensed, physician assistants must complete 100 hours of continuing medical education every 2 years and pass the Physician Assistant National Recertifying Examination every 10 years (National Commission on Certification of Physician Assistants [NCCPA], 2014).

Physician Assistant Competencies

Similar to other health care providers (e.g., physicians and nurse practitioners), physician assistants are held accountable for their role in clinical care through a series of professional competencies. In 2005, the NCCPA, along with the PAEA, Accreditation

Review Commission on Education for the Physician Assistant (ARC-PA), and AAPA released the *Competencies for the Physician Assistant Profession* (Table 1), a document which defines the knowledge, skills, and attitudes essential for physician assistants (NCCPA, 2012). Accordingly, physician assistants are required to acquire and demonstrate the effective and appropriate application of the following six competencies: medical knowledge, interpersonal and communication skills, patient care, professionalism, practice-based learning and improvement, and systems-based practice (NCCPA, 2012). In addition to the professional competencies for which physician assistants must adhere, physician assistant practice is also dedicated to the overarching themes of patient safety, cultural competence, quality health care, lifelong learning, professional growth, and the physician–physician assistant relationship (NCCPA, 2012).

Table 1

Competencies for the Physician Assistant Profession

Competency Domain	**Essential Knowledge, Skills, and Attitudes**
Medical Knowledge	*Physician assistants are expected to:* • Practice evidence-based medicine • Understand etiologies, risk factors, pathologic process, and epidemiology for medical conditions • Identify the signs and symptoms of medical and surgical conditions • Select appropriate diagnostic or lab studies • Understand scientific principles related to patient care • Manage general medical and surgical conditions, including recognizing and understanding pharmacologic agents and other treatment modalities • Use appropriate methods to identify conditions in asymptomatic patients • Appropriately use history and physical findings and diagnostic studies to formulate differential diagnoses • Implement interventions for disease prevention and health promotion/maintenance
Interpersonal & Communication Skills	*Physician assistants are expected to:* • Create and sustain an ethically sound and therapeutic relationship with patients • Use effective communication skills to obtain and provide information • Appropriate adapt communication style and messages to the context of the individual patient interaction • Work effectively with physicians and other health care professionals, including members of other professional groups • Demonstrate emotional resilience and stability, adaptability, flexibility, and tolerance of ambiguity and anxiety • Accurately and adequately document patient care information

(table continues)

Competency Domain	Essential Knowledge, Skills, and Attitudes
Patient Care	*Physician assistants are expected to:* • Work effectively with physicians and other health care professionals to provide patient-centered care • Demonstrate compassion and respect toward patients and their families • Gather essential and accurate information about their patients • Make informed decisions about diagnostic and therapeutic interventions based on patient information and preferences, current scientific evidence, and informed clinical judgment • Develop and implement patient management plans • Counsel and educate patients and their families • Competently perform medical and surgical procedures considered essential in their area of practice • Provide health care services and education aimed at disease prevention and health promotion • Employ information technology to support patient education and care decisions
Professionalism	*Physician assistants are expected to:* • Understand legal and regulatory requirements, as well as the appropriate role of the physician assistant • Foster professional relationships with physician supervisors and other health care providers • Have respect, compassion, and integrity • Demonstrate responsiveness to the needs of patients and society • Maintain accountability to patients, society, and the profession • Show commitment to excellence and ongoing professional development • Remain committed to the ethical principles pertaining to clinical care, patient information, informed consent, and business practices • Demonstrate sensitivity and responsiveness to their patients' culture, age, gender, and disabilities • Practice healthy behaviors and life balance • Facilitate the learning of students and/or other health care professionals • Demonstrate self-reflection, critical curiosity, and initiative

(table continues)

Competency Domain	Essential Knowledge, Skills, and Attitudes
Practice-based Learning & Improvement	*Physician assistants are expected to:* • Analyze practice experience and perform practice-based improvement activities using a systematic methodology • Locate, appraise, and integrate evidence from scientific studies related to their patients' health problems • Apply knowledge of study designs and statistical methods to the appraisal of clinical studies and other information on diagnostic and therapeutic effectiveness • Utilize information technology to manage information, access online medical information, and support their own education • Recognize and appropriately address personal biases, gaps in medical knowledge, and limitations in themselves and others
Systems-based Practice	*Physician assistants are expected to:* • Effectively interact with various types of medical practice and delivery systems • Understand and effectively use the funding sources and payment systems that provide coverage for patient care • Practice cost-effective health care and resource allocation that does not compromise quality of care • Advocate for quality patient care and assist patients in dealing with system complexities • Partner with supervising physicians, health care managers, and other health care providers to assess, coordinate, and improve the delivery of health care and patient outcomes • Accept responsibility for promoting a safe patient care environment and recognizing and correcting systems-based factors that negatively impact patient care • Apply medical information and clinical data systems to provide effective, efficient patient care • Recognize and address system biases that contribute to health care disparities • Apply population health concepts and principles to patient care

Note. From "Competencies for the Physician Assistant Profession," by the National Commission on Certification of Physician Assistants," 2012, pp. 2–4. Reprinted with permission.

The professional competencies define the knowledge, skills, and attitudes essential for physician assistants; however, they go beyond systematically describing what the physician assistant is responsible for acquiring and demonstrating, they also speak to the importance of integrating health promotion and disease prevention strategies in clinical settings, applying population health concepts to patient care, and practicing healthy behaviors (NCCPA, 2012). Not only is it feasible for these activities to occur in physician assistant practice, it is a requisite.

Scope of Practice

Scope of practice is a term used by state licensing boards to define the limit to which the law or employer permits the physician assistant to provide medical care (Henry et al., 2011, p. 221). A physician assistant's scope is largely defined by his or her education, experience, state law, physician delegation, and other institutional policies (AAPA, 2011). All states plus the District of Columbia, Commonwealth of the Northern Mariana Islands, and Guam authorize physician assistants to practice and prescribe medication. However, they are only authorized to practice, not prescribe in the U.S. Virgin Islands, and interestingly enough, are not authorized to practice in Puerto Rico (AAPA, 2012).

Rigorously trained in the medical model, physician assistants are licensed to work under the auspices of a physician; have direct patient contact; provide comprehensive care through evaluation, diagnosis, and treatment; maintain substantive independence and autonomy; and are responsible for the care their patients receive (Zenzano et al., 2011). Furthermore, they have a unique opportunity to impart health promotion and education in clinical settings (NCCPA, 2012; Zenzano et al., 2011).

Historically, the roles and functions of the physician assistant began as an answer to the shortage and unequal distribution of primary care physicians and to increase health care access to the medically underserved and disadvantaged (Cawley, 1996; Mittman et al., 2002). Today, physician assistants practice medicine in a variety of other specialties and settings (Mittman et al., 2002), but also continue to provide health care services in low shortage areas.

Patient Satisfaction

Though physician assistants are well established and received as a competent member of the health care delivery system (Baldwin et al., 1998; Fang, 2012; Hooker et al., 2005; O'Connor & Hooker, 2007; Roblin et al., 2004), their utilization (Henry et al., 2011) is largely dictated by patient attitudes and perceptions (Strunk, 1973). Estes and Howard (1971) early on said physician assistants would not only be accepted by patients, but also extend the reach of the physician. Kadish and Long (1970) believed that physician assistants would be accepted if the general population felt they provided quality care. This notion was reiterated in a survey of urban Los Angeles patients frequenting the UCLA Hospital Outpatient Clinic (Strunk, 1973). Patients were asked to answer a 30-question survey to assess patient acceptance of the use of physician assistants. Question Number 28 on the attitude scale asked patients' willingness to be treated by a physician assistant. More than two thirds agreed or strongly agreed to the response "if I felt that he knew what he was doing" (Strunk, 1973).

Another study conducted found that of the 54% of patients who responded to a 1970s questionnaire on patient satisfaction, 89% felt physician assistants were competent, 86% felt they were professional, 71% and 79% felt they improved the quality of care and

access to services, respectively, and 87% were very satisfied with the care received (Nelson, Jacobs, & Johnson, 1974). Likewise, a study on patient satisfaction with physician assistants in rural primary care found that patients were highly satisfied with the services they received (Oliver, Conboy, & Donahue, 1986). It was also noted that women and patients with more education tend to react more favorable to physician assistants, than their counterparts (Oliver et al., 1986).

Furthermore, in a national, cross-sectional survey of 146,880 randomly selected Medicare beneficiaries (45.7% total surveyed); Hooker et al. (2005) found that elderly patients held physician assistants in the same regard as their physician counterparts. For all indices of satisfaction, physician assistants were rated as favorably as physicians. This finding suggests there is no difference between provider types when it comes to patient satisfaction. The study also revealed the technical skills of physician assistants was rated within 3% to 4% of physicians (Hooker et al., 2005).

Lastly, a study conducted by the AAPA found that a majority of the U.S. public said they were willing to be seen and treated by a physician assistant (Dehn, 2007). A telephone survey of 1,000 randomly selected adults found that a little over 80% of respondents would be willing to be seen by a physician assistant for a routine health visit. Additionally, 90% of those who had been previously treated by a physician assistant said they would see a physician assistant again (Dehn, 2007).

Physician Assistant Effectiveness

In primary care practice, it is neither necessary nor efficient for every patient to see a physician (Hooker & Everett, 2012). Therefore, according to Hing and Uddin (2010), there is greater utilization of nonphysician health care providers, such as

physician assistants, in these settings. Though physician assistants are required to work in collaboration with and under the supervision of a licensed physician, most states allow them to work in a "negotiated performance autonomy" role (Mittman et al., 2002, p. 485). This means the supervising physician does not have to be physically present for the physician assistant to practice. Because of this structure, many physician assistants staff satellite clinics, especially in rural areas (Henry et al., 2011), and provide on-call services (Mittman et al., 2002).

Studies have illustrated the quality of care given by physician assistants to be equal to that given by physicians and other nonphysician health care providers such as nurse practitioners (Everett, Schumacher, Wright, & Smith, 2009; Hooker & Everett, 2011; Mittman et al., 2002). Additionally, physicians who work with physician assistants have noted that the advantages outweigh the disadvantages (Mittman et al., 2002). Some of the advantages are: the physician's ability to work fewer hours, shared on-call schedule, and the effectiveness of the physician assistant to provide primary care services in underserved areas (Mittman et al., 2002). Physician assistants serve as both substitutes for and complements to physician services.

Although scarce, research indicates the incorporation of physician assistants into the U.S. health care delivery system is warranted. As a profession, physician assistants make significant contributions to their patients and in the settings in which they work (Everett et al., 2009). The care rendered is professional, effective, and satisfying to patients and the physicians who employ them.

Factors Influencing Preventive Care Practices

Though the literature is replete with discussions on the importance of preventive care practices in clinical settings, such services are delivered at relatively low rates (Vickers, Kircher, Smith, Petersen, & Rasmussen, 2007). Previous research suggests practitioner advice has been effective in reducing excessive alcohol consumption, encouraging tobacco cessation, and the modification of some diet- and activity-related cardiovascular risk factors (Carlson et al., 2009; Dunn et al., 2009; Galuska et al., 1999; Hunt et al., 1995; Pipe et al., 2009; Pool et al., 2013; Smith et al., 2011; Whitlock et al., 2002). Additionally, research suggests practitioners who work in primary care, have positive attitudes toward prevention and counseling, believe they are effective at modifying patient behaviors, and engage in healthy activities themselves are more apt to implement preventive services in their practice of medicine (Bellas et al., 2000; Dunn et al., 2009; Howe et al., 2010; Laws et al., 2009; Oberg & Frank, 2009; Pipe et al., 2009).

This section explores the factors influencing preventive care practices of physician assistants and sets the foundation for answering the research questions presented in Chapter 1 and Chapter 3. Since there is limited research on the preventive care practices of physician assistants, literature pertaining to physicians will be used because physician assistants are trained in the medical model and are members of the physician-led medical team. Additionally, literature on the preventive care practices of nurse practitioners will also be evaluated because like the physician assistant, they too are valuable nonphysician providers.

Personal Health Habits

Confidence in the ability to counsel patients on healthy lifestyle choices may be related to personal health habits (Howe et al., 2010). Additionally, clinicians who live a healthier lifestyle send believable messages to their patients, experience better personal health, and provide improved patient care (Howe et al., 2010; Lewis et al., 1986; Oberg & Frank, 2009). Furthermore, practicing healthy behaviors has been shown to be the most "consistent and powerful predictor of physicians counseling patients about related prevention issues" (Shahar et al., 2009, p. 533).

Very few studies have examined personal health practices in relationship to practice behaviors (Schwartz et al., 1991). Of the members and fellows of the American College of Physicians who participated in a study on internists' use of disease prevention and health promotion activities, 50% did not have a personal physician and 55% had not had a physical exam within the last 3 years (Schwartz et al., 1991). Furthermore, a study in 1997 found similar results. Thirty-five to 56% of physicians participating in a Johns Hopkins School of Medicine cohort study did not have a regular source of care (Gross, Mead, Ford, & Klag, 2000). These findings are important because studies have indicated that physicians' personal preventive care influences the advice they offer their patients (Hung et al., 2006).

Smoking status influences to what extent physicians inquire about patient tobacco use and suggest/advise cessation (Frank, Segura, Shen, & Oberg, 2010; Pipe et al., 2009). Because of the role physicians play in influencing health behaviors, they have become the target population in smoking behavior studies (Coe & Brehm, 1971). However, many of the studies found in literature about cigarette smoking among physicians and other

clinicians were based outside of the United States (Maziak, Mzayek, Asfar, & Hassig, 1999; Smith & Leggat, 2007; Tapia-Conyer et al., 1997; Uysal, Dilmen, Karasulu, & Demir, 2007) or were older studies (Bortz, 1992; Garfinkel & Stellman, 1986). Research conducted on an international review of smoking in the medical profession over a 30 year period, 1974–2004; found that the lowest smoking rates were consistently documented in the United Kingdom, Australia, and the United States (Smith & Leggat, 2007).

Likewise, a vast number of physicians (84%) participating in a study that examined personal health behaviors and wellness among licensed physicians in California stated their health status was excellent (Bazargan, Makar, Bazargan-Hejazi, Ani, & Wolf, 2009). Using the Alcohol Use Disorders Identification Test (AUDIT), researchers found that 5.7% of the study participants engaged in harmful alcohol drinking behaviors (Bazargan et al., 2009). Because physicians' health habits are a stable predictor of the level and rate they counsel their patients (Dunn et al., 2009; Howe et al., 2010; Lewis et al., 1986; Pipe et al., 2009), this percentage translates to approximately 5,000 physicians (Bazargan et al., 2009) who are either not counseling on excessive alcohol consumption or who are counseling but not following their own advice.

Contrarily, in a study of randomly selected members and fellows of the American College of Physicians, Lewis, Clancy, Leake, and Schwatz (1991) found that 11% drank daily, 27% consumed alcohol several times per week, 13.3% were nondrinkers, and 7.2% believed they drank too much. Interestingly enough, the study showed that male internists who drank still counseled their patients on the ill effects of alcohol consumption. This finding dispels the earlier finding of Lewis et al., (1986) which showed a positive

association between physicians' personal health habits and their propensity to counsel (Lewis et al., 1991).

The role diet and exercise plays in the prevention and treatment of health issues has been well established (Cornuz et al., 2000; Frank et al., 2002; Kushner, 1995; Pool et al., 2013). For instance, data on the nutrition-related practices of U.S. female physicians found that not only were nutrition and weight related issues important in their personal lives; they were reflected in their professional work with patients (Frank et al., 2002). Of the 4,501 U.S. female physicians surveyed, 43% performed nutritional counseling, 50% performed weight management counseling, 46% felt that discussing nutrition was relevant to their practice, 47% felt the same about weight counseling, and 21% said they received nutritional training (Frank et al., 2002). Furthermore, those physicians who reported relatively healthy diets and diet-related habits were more likely to counsel their patients than those who did not adhere to such behaviors (Frank et al., 2002).

A separate study found that slightly over 40% of the primary care physicians and physician assistants interviewed were overweight (Forman-Hoffman, Little, & Wahls, 2006). In yet another study, Howe et al. (2010) found that physicians in training and attending physicians (n = 183) reported low levels of fruits and vegetables. Additionally, trainees were more likely than attending physicians to indulge in fast food. As a result, both studies found that diet and weight management practices geared toward patients were moderately low (Forman-Hoffman et al., 2006; Howe et al., 2010). This is of concern because research suggests that patients not only view physicians as credible sources of information, but also rely on them to provide dietary advice and guidance (Frank et al., 2002).

Likewise, since regular physical activity can reduce the prevalence and incidence of several chronic diseases, the personal exercise habits of physicians is also important to discuss. For example, Howe et al. (2010) also found that physicians in training and attending physicians reported low levels of exercise. In the study, only 9.8% of trainees and 39.5% of attending exercised four or more times a week, and 7.8% of trainees and 28.5% of attending followed the recommended guidelines of at least 150 minutes per week of aerobic exercise.

A clinical investigation into the exercise habits and counseling practices of primary care physicians found that physicians who engaged in aerobic exercise and/or strength training on a frequent basis were more likely to counsel their patients on the benefits of exercise for a healthier lifestyle (Abramson, Stein, Schaufele, Frates, & Rogan, 2000). Additionally, physicians with lower BMIs were more apt to counsel on nutrition, weight management, and exercise (Frank et al., 2010). In essence, clinicians who themselves heed the advice they give are not only healthier, but also provide better counseling and motivation to their patients (Lobelo, Duperly, & Frank, 2008; Lewis et al., 1986).

Prevention and Counseling Attitudes and Perceived Barriers

Clinician advice has been linked to increased patient efforts in modifying negative health behaviors (e.g. smoking and alcohol intake) and increased satisfaction with medical care (Galuska et al., 1999; Hunt et al., 1995; Pipe et al., 2009; Pool et al., 2013; Smith et al., 2011; Whitlock et al., 2002). Research suggests practitioners believe they are responsible for promoting healthy behavior (Kolasa & Rickett, 2010; Ma et al., 2004) and counseling patients about lifestyle modification (Kolasa & Rickett, 2010; Delnevo et al.,

2003). Unfortunately, the level for which they incorporate health promotion and disease prevention during patient interaction is relatively low (Gelly et al, 2013; Laws et al., 2009; Shires et al., 2012; Yarnall et al., 2003;Yeazel et al., 2006). Often cited are barriers to preventive medicine delivery, including lack of time, insufficient reimbursement, low patient interest, uncertainty about what preventive services to provide, lack of self-confidence, and inadequate clinician training (Carlson et al., 2009; Kolasa & Rickett, 2010; Oscós-Sánchez et al., 2008; Pool et al., 2013; Shires et al., 2012; Whitlock et al., 2002; Woolf, 2008; Yeazel et al., 2006).

It has been demonstrated that lack of time is the major contributor to the suboptimal rates of preventive care delivery (Pollak et al., 2008; Yarnall et al., 2009). It is suggested that primary care physicians do not have adequate time to deliver all the clinical preventive and chronic disease services recommended (Pollak et al., 2008; Yarnall et al., 2009). According to their study, Yarnall et al. (2009) found that approximately 3.7 hours of a physician's day is spent on acute care (46%), 3.0 hours on chronic disease care (38%), and 1.3 hours delivering preventive care (16%). If the recommended guidelines for preventive services and the 10 most common chronic diseases were adhered to, they, along with acute care, would require 21.7 hours a day (Yarnall et al., 2009).

As discussed previously, practitioners' own health habits may predict to what extent they carry out health promotion and disease prevention (Cornuz et al., 2000; Dunn et al., 2009; Galuska et al., 1999; Hunt et al., 1995; Whitlock et al., 2002). Additionally, perceived effectiveness and importance of prevention, impact of personal health behavior, and comfort level addressing sensitive topics may all contribute to the reason

why clinicians provide preventive services to their patients at less than optimal rates (Laws et al., 2009; Shires et al., 2012; Yarnall et al., 2003; Yeazel et al., 2006). Furthermore, health care providers who have positive attitudes toward prevention and counseling and believe they are effective at modifying patient behavior are most successful in incorporating health promotion and disease prevention strategies in their practice of medicine (Bellas et al., 2000; Dunn et al., 2009; Howe et al., 2010; Laws et al., 2009; Pipe et al., 2009).

A systematic study of 19 peer-reviewed journal articles found that while most primary care physicians did not have negative attitudes toward counseling patients on smoking, a significant minority did (Vogt, Hall, & Marteau, 2005). They identified eight negative beliefs and attitudes, in which "discussions were too time consuming" was the most common (42%) response (Vogt et al., 2005, p. 1423). Thirty-eight percent said such counseling was ineffective, 22% lacked confidence in their ability to discussing smoking with their patients, 18% felt smoking counseling was unpleasant, 16% lacked confidence in their knowledge, 5% felt it was outside their professional duty or that it intruded upon patient privacy, and 3% felt smoking discussions were inappropriate (Vogt et al., 2005). Authors suggest that additional training in behavioral health counseling and organizational changes, such as reminders to facilitate interventions may result in more positive beliefs and attitudes (Vogt et al., 2005).

A study assessing the comfort with, frequency of, and perceived effectiveness of diabetic nutrition counseling by internal medicine residents; response rate of 94% (n = 111) found that fewer residents (56%) were comfortable with diabetic nutrition counseling compared with counseling on diabetic symptoms related to

hypo/hyperglycemia (90%, $p < 0.001$; Tang et al., 2009). Sixty-three percent counseled on diabetic nutrition compared to 87% for medication adherence (Tang et al., 2009). Twenty-eight percent of the residents reported having prior education with chronic disease management, and were more comfortable with diabetic nutrition counseling (OR 3.2, 95% CI 1.4-7.3, $p = 0.006$), and reported counseling more frequently, though not statistically significant (OR 1.8, 95% CI 0.86-3.8, $p = 0.12$; Tang et al., 2009). Additionally, as a whole, more frequent counseling was reported by those who were more comfortable or felt more effective counseling on diabetic nutrition (OR 1.5, 95% CI 1.0-2.2, $p = 0.03$ and OR 3.6, 95% CI 2.1-6.1, $p < 0.001$, respectively; Tang et al., 2009).

Critique of Methods

Though there is considerable discussion on the importance of integrating health promotion and disease prevention in clinical settings, as well as practitioner attitudes and self-reported delivery of clinical preventive services, many of these studies are not critical in regard to sample size, sample biases, variables included, or statistical methods. Additionally, despite the increased use of physician assistants over the last 45 years, the literature is deficient in studies on their health promotion and disease prevention habits, attitudes, beliefs, and clinical practices.

As more physicians enter specialty areas, there will be an increased need for nonphysician health care providers, such as physician assistants. Therefore, given the paucity of research on physician assistants, more research is needed in order to better understand their roles in the delivery of health promotion and disease prevention in clinical settings.

This study aimed to fill a research gap by adding to the existing body of knowledge. In order to accomplish this, the research design used robust sampling methods; minimized sampling bias; tested multiple variables through the conceptual framework proposed in Chapter 1, and employed descriptive and inferential statistical methods, as to provide a comprehensive picture of the study population.

Summary

The literature review provided a detailed look into the conceptual framework guiding this study and presented information on the U.S. health care delivery system, including a look at public health's role in health promotion and disease prevention and the PPACA. Additionally, the historical background on the advent of the physician assistant profession was presented. This chapter also highlighted physician assistant training and certification, competencies, scope of practice, patient satisfaction, and their effectiveness. Furthermore, there was a review on the factors that influence the delivery of preventive services, including personal health habits, attitudinal variables, and perceived barriers to delivering preventive services.

Despite the research presented, there still remains a lack of knowledge on the relationship between physician assistants' preventive medicine practices, health habits, attitudes, and beliefs. The next chapter, Chapter 3, outlines the research design and rationale, setting and sample, instrumentation and measures, data collection, statistical analysis, and study participants' rights.

Chapter 3: Research Methods

Introduction

The aim of this study was to provide an understanding about the relationship between physician assistants' preventive medicine practices, personal health habits, attitudes toward prevention and counseling, and perceived barriers to delivering preventive care; a secondary objective was to predict physician assistants' counseling practices.

Despite the increased use of physician assistants over the last 45 years (Hooker, 2006; Hooker et al., 2005; Hooker & Berlin, 2002; Hooker & McCaig, 2001; Mittman et al., 2002), there is limited research on the delivery of preventive services facilitated by physician assistants, as well as the relationship between their preventive medicine practices, personal health habits, prevention and counseling attitudes, and perceived barriers to delivering preventive services.

This chapter includes a discussion of the research design, setting and sampling decisions, instrumentation and measures, study variables, data collection methods, statistical analysis used to address the research questions and test the hypotheses, and the protection of participants' rights. This study was approved by the Walden University Institutional Review Board (IRB); approval number #03-03-2014-0027467.

Research Design and Rationale

This study surveyed licensed physician assistants attending the AAPA 42nd Annual Conference in Boston, Massachusetts, May 24–28, 2014. Data were collected during the 2-day exposition (May 27–28, 2014) using a cross-sectional, group-administered study design. This method provided an easy and convenient way to gather

data on the population under study. Since the cross-sectional design provides a snapshot of a population at a specific point in time (Blumenthal & DiClemente, 2004), it is useful in answering questions pertaining to prevalence and correlation. In addition to describing the population, cross-sectional surveys also provide the opportunity to answer secondary research questions and test certain hypotheses (Bowling, 2002). Therefore, because this study sought to determine the relationship between physician assistants' preventive medicine practices, personal health habits, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services, the use of a cross-sectional study design was appropriate.

Setting and Sample

Study Participants

Study participants were drawn from the AAPA 42nd Annual Conference. There were 5,836 attendees; 314 participated in the study, for a response rate of 5.4%. Participant recruitment was conducted May 27–28, 2014, during the 2-day exposition. Physician assistants who approached the Physician Assistant Preventive Medicine Practices' booth (#749; Appendix B)—located in the nonprofit section of the exhibit hall—were asked to participate in the study. Due to the busy nature of the setting, it is unknown how many physician assistants approached the booth and how many declined participation.

Sample Size

In order to calculate the sample size needed for this study, G*Power 3.1.7, a free power analysis program (Faul, Erdfelder, Lang, & Buchner, 2007) was used. Effect size (f^2), which measures the strength of a phenomenon, was set at medium (0.15); the

probability of committing a Type I error (α) was set to 0.05; and the power, which measures the probability of committing a Type II error (1-β), was set at 0.95 (Fox, Hunn, & Mathers, 2007). Because the maximum number of predictors analyzed at one time was 11 (Research Questions 3 and 5), the sample size needed to achieve a minimum statistical power was 178.

The sampling frame for this study was the 5,836 AAPA 42nd Annual Conference attendees; however, only attendees who were physician assistants and agreed to participate were included in the study. Those not currently practicing (e.g., retirees) or interacting with adult patients (e.g., physician assistants who work solely with pediatric patients) only answered questions about their health habits and personal and professional characteristics; capturing their demographic information was useful in providing descriptive data on the entire study sample.

Instrumentation and Measures

The survey instrument, the Physician Assistants' Preventive Medicine Practices Questionnaire (PAPMPQ), consisted of 104 items, and addressed physician assistants' personal and professional characteristics, personal health habits, and preventive medicine activities, attitudes, and beliefs. The instrument was developed using questions from two validated questionnaires: the Preventive Medicine Attitudes and Activities Questionnaire (Yeazel et al., 2006) and the Summary of Diabetes Self-Care Activities measure (Toobert, Hampson, & Glasgow, 2000). Additionally, the instrument included questions from The Cardiologists' Lifestyle Survey (Abuissa, Lavie, Spertus, & O'Keefe, 2006), and the published study, "Physician, heal thyself? Regular source of care and use of preventive health services among physicians" (Gross et al., 2000). Personal and

professional (demographic) questions were also included. The original authors and copyright holders of each instrument provided written permission for the use of their instrument in this research study; permission letters are on file.

The Preventive Medicine Attitudes and Activities Questionnaire

The PMAAQ is a validated tool for gaining insight into clinicians' preventive medicine behaviors and beliefs. It assesses clinicians' self-reported preventive medicine behaviors (e.g., risk assessment, behavior modification, and lifestyle counseling); perceptions about the importance and effectiveness of such activities; comfort with addressing sensitive topics, and perceived barriers to the delivery of clinical preventive services (Yeazel et al., 2006). According to Murphy, Yeazel, & Center, (2000) and Yeazel et al. (2006), the theoretical underpinnings of the PMAAQ are consistent with the social cognitive theory (SCT) and is driven by its five key constructs: *self-efficacy* (confidence in performing a particular behavior), *situation* (perception of the environment), *behavioral capacity* (knowledge and skill to perform a desired behavior), *expectancies* (values placed on a given outcome), and *expectations* (anticipated outcomes of a behavior).

The PMAAQ consists of 84 items, divided into eight scales and three overarching themed scales (behavior, attitude, and barrier). The behavior scale uses a Likert scale ranging from *never to always*. The attitude scale also uses a Likert scale, but has three different ranges: *very effective to do not counsel; very important to not very important*; *and strongly agree to strongly disagree*. Lastly, the barrier scale uses a Likert scale range of *not important to very important*. Items on the attitudes scale with a negatively phrased stem were reversed coded, so that all scales are scored in the same direction. Higher

numbers on the behavior scale indicate greater frequency of preventive services delivery. Lower numbers on the attitude and barrier scales indicate more preventive behaviors, greater importance and effectiveness, and fewer barriers to providing preventive services (Yeazel et al., 2006). Table 2 provides a description of the PMAAQ scales.

Table 2

Description of PMAAQ Scales

Scale Name	Number of Items	Description	Example Items	Scoring[a]
Overall prevention behavior[b]	26	Frequency (last 60 days) of prevention behaviors with symptomatic/asymptomatic patients	Assessing and advising about diet, exercise, immunizations, seatbelt use, cancer screening	1 (never, 0%) to 7 (always, 100%)
Smoking cessation[b]	7	Frequency (last 60 days) of smoking cessation behaviors with patients who smoke	Help set quit date, arrange staff follow-up, prepare patients for withdrawal symptoms	1 (never, 0%) to 7 (always, 100%)
Hypertension management[b]	4	Frequency (last 60 days) of hypertension management behaviors with affected patients	Review risks of hypertension, advise salt reduction	1 (never, 0%) to 7 (always, 100%)
Behavioral change effectiveness[c]	12	Perceived effectiveness in changing patients' behaviors	Exercise, healthy diet, injury prevention, depression management, alcohol use	1 (very effective) to 4 (minimally effective); 5 (do not counsel)
Lifestyle counseling effectiveness[c]	5	Attitudes toward counseling and health education	"Patients without symptoms will rarely change their behavior on basis of my advice"	1 (strongly agree) to 5 (strongly disagree)

(table continues)

Scale Name	Number of Items	Description	Example Items	Scoring[a]
Importance[c]	15	Importance of providing patients with primary prevention counseling	Alcohol consumption, exercise, injury prevention, stress reduction	1 (very important) to 4 not very important)
Comfort[c]	4	"I feel comfortable discussing [topic] with patients."	Drug use, sexual behavior, sexual orientation, HIV	1 (strongly agree) to 5 strongly disagree)
Barriers[d]	11	Importance of potential barriers to provision of preventive services	Lack of time, poor reimbursement, low patient/provider interest, communication difficulties with patients	1 (not important) to 5 (very important)

[a] Items on the attitudes scale with a negatively phrased stem were reverse coded, so that all scales are scored in the same direction. Lower numbers on the attitudes and barriers scales indicate more preventive behaviors, greater importance and effectiveness, and fewer barriers to providing preventive services. Higher numbers on the behaviors scale indicate greater preventive services delivery. [b] Behaviors scale; [c] Attitudes scale; [d] Barriers scale.

Note. From "A validated tool for gaining insight into clinicians' preventive medicine behaviors and beliefs: The preventive medicine attitudes and activities questionnaire (PMAAQ)," by Yeazel, M., Bremer, K., & Center, B., 2006, *Preventive Medicine*, 43, p. 87. Copyright 2006 by Elsevier. Reprinted with permission.

In order to establish validity and reliability, the PMAAQ was administered from 1995 to 2003 to 353 residents in six U.S. primary care residency programs (Yeazel et al., 2006). Validity and reliability of the questionnaire were demonstrated through content validity, calculation of internal consistency reliabilities, divergent validity, external validity, and stability measures. High internal consistency reliabilities (Cronbach's α = 0.74 to 0.98) were seen among the eight scales. Demonstrated by low to moderate intercorrelations (r = -0.23 to 0.54), divergent validity among scales was established. Content validity was established by experts in community health and preventive medicine (Yeazel et al., 2006).

Because the PMAAQ was administered to residents in primary care residency programs, the authors warn that generalizability of results to nonresident physicians is unknown and should be approached carefully (Yeazel et al., 2006). Despite this warning, the tool was used because it is comprehensive and has great potential to answer the study's research questions.

The Summary of Diabetes Self-Care Activities Measure

The SDSCA measure is a widely used self-report questionnaire that assesses diabetes self-management in relation to diet (general and specific), exercise, blood-glucose testing, foot care and smoking (Toobert et al., 2000). Validity and reliability of the survey instrument were seen through normative data (means and standard deviation), inter-item and test-retest reliability, and correlations presented in seven studies (five randomized interventions and two observational studies; Toobert et al, 2000). Mean levels computed across all seven studies (weighted for sample size) for general diet was: M = 58.6, SD = 28.7, n = 1,409 and for specific diet: M = 67.5, SD = 16.9, n = 973

(Toobert et al., 2000). Accordingly, the average inter-item correlation within scales was high (M = 0.47), and with the exception of specific diet (r = 0.07-0.23), the test-retest was moderate (M = 0.40). The validity of the subscales was also supported (M = 0.23; Toobert et al., 2000).

Although this dissertation research was not on diabetics and their self-care activities, three questions from the SDSCA pertaining to diet were used. These questions are valid and reliable, and were appropriate and useful in gaining insight into the dietary habits of physician assistants. Participants were asked to think about their healthful eating plan (general diet) and their fruit, vegetable, and fat consumption (specific diet) over the previous seven days and respond. An 8-point Likert scale ranging from 0 to 7 was used and the mean number of days for each response was calculated. Scoring for the item related to fat consumption was scored in a reverse order (e.g., 0 = 7, 7 = 0). Table 3 provides details on the SDSCA scales.

Table 3

Description of SDSCA Diet Scales

Question	**Scale**	**Scoring**
How many of the last SEVEN DAYS have you followed a healthful eating plan?	0 1 2 3 4 5 6 7	General Diet = Mean number of days
On how many of the last SEVEN DAYS did you eat five or more servings of fruits and vegetables?	0 1 2 3 4 5 6 7	Specific Diet = Mean number of days
On how many of the last SEVEN DAYS did you eat high fat foods such as red meat or full-fat dairy products?	0 1 2 3 4 5 6 7	Specific Diet = Mean number of days; scoring is reversed (0 = 7, 1 = 6, 2 = 5, 3 = 4, 4 = 3, 5 = 2, 6 = 1, 7 = 0)

Note. Adapted from "The summary of diabetes self-care activities measure, Results from 7 studies and a revised scale," by Toobert, D., Hampson, S., & Glasgow, A., 2000, *Diabetes Care, 23*(7), p. 948. Copyright 2000 by American Diabetes Association. Reprinted with permission.

The Cardiologists' Lifestyle Survey

The Cardiologists' Lifestyle Survey is a 1-page, 25-item anonymous questionnaire used to assess the self-reported personal health habits of cardiologists (Abuissa et al., 2006). In August and September 2004, the authors sent the survey to 800 cardiologists in a large coalition of single-specialty cardiology groups (Abuissa et al., 2006). Surveys were collected until February 1, 2005 and a total of 471 surveys were returned, for a response rate of 59% (Abuissa et al., 2006). According to the results, cardiologists appeared to be healthier than the general US population (Abuissa et al., 2006). The survey consists of three sections (baseline information, medical illnesses, and medications; Abuissa et al., 2006). Because little is known about the body mass index, smoking status, amount of exercise, and alcohol consumption of physician assistants, only the baseline information was incorporated. Of specific interest were the questions related to body mass index *(height and weight)*, smoking status (*never smoked; former smoker; 1–10 cigarettes per day; > 10 cigarettes per day*), exercise (*no exercise; 1–2 times per week; 3–4 times per week; ≥ 5 times per week*) and alcohol intake (*no alcohol; 1–2 drinks per day; 3–4 drinks per day; ≥ 5 drinks per day*).

Regular Source of Care

The published article, "Physician, heal thyself? Regular source of care and use of preventive health services among physicians," discusses a 1991 questionnaire used to assess the regular source of care (RSOC) for a cohort of John Hopkins School of Medicine physicians (Gross et al., 2000). In the study, 77% (n = 915) of those asked to complete the survey responded (Gross et al., 2000). Nearly a third of the respondents had no RSOC (n = 312), and compared to pediatricians, pathologists were more than five

times as likely to not have an RSOC (Gross et al., 2000). Internists, surgeons, and other physicians were also significantly more likely to not have an RSOC (Gross et al., 2000). The respondents of the 1991 survey were surveyed again in 1995 and 1997 to learn how RSOC influenced their utilization of preventive health services. The study found that not having an RSOC in 1991 predicted the underutilization of preventive services, including cancer screenings and influenza vaccinations (Gross et al., 2000). Furthermore, respondents with chronic disease were also less likely to have an RSOC (Gross et al., 2000).

There is no available research on the RSOC of physician assistants; therefore, participants were asked about their regular source of care. Possible responses include: *no RSOC, self-treated, clinician in own group practice, clinician independent of group practice, or other source of care* (Gross et al., 2000). For the purpose of this study, physician assistants with no RSOC were defined as those who indicate either no RSOC or self-treated (Gross et al., 2000).

Personal and Professional Characteristics

Lastly, demographic questions were used to provide descriptive information on the physician assistants in the study. In order to better understand the personal and professional characteristics of the study population, the following variables were assessed: gender, age, race/ethnicity, years licensed as a physician assistant, primary clinical specialty, practice status (actively/not actively managing patients), practice location (region), practice environment, hours worked per week, number of patients seen per day, and type of patient seen (adult/pediatric).

Study Variables

The aim of this study was threefold. First, to determine the relationship between physician assistants' personal health habits, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services (independent-predictor variables) and their preventive medicine practices (dependent-outcome variable). Second, to determine the relationship between physician assistants' personal health habits and perceived barriers to the delivery of clinical preventive services (independent-predictor variables) and their prevention and counseling attitudes (dependent-outcome variable), and third, to predict physician assistants' counseling practices. Table 4 depicts the study variables, measurement levels, and description in relation to each research question. In order to clearly define each research variable, increase the quality of results, and improve the strength of the study design, variables were operationalized. Operationalization allowed concepts to be empirically and quantitatively measured.

Table 4

Operationalization of Study Variables

Research Question	Variables	Measurement Scale & Description
Research Question 1: *Is there a relationship between physician assistants' personal health habits and their preventive medicine practices?*	**Outcome:** Preventive medicine practices	*Interval* 1 = Never 2 = Rarely 3 = Sometimes 4 = About half the time 5 = Often 6 = Usually 7 = Always
	Predictor: Personal health habits:	*Ordinal, Interval, and Nominal*
	• Body mass index	Height and weight
	• Smoking status	1 = Never Smoked 2 = Former Smoker 3 = 1-10 cigarettes/day 4 = >10 cigarettes/day
	• Alcohol consumption	1 = No Alcohol 2 = 1–2 drinks/day 3 = 3–4 drinks/day 4 = ≥5 drinks/day
	• Diet	General Diet and Specific Diet (healthy) = Mean # of Days: 0 1 2 3 4 5 6 7 Specific Diet (unhealthy) = Mean # of Days (reverse): 0 = 7, 1 = 6, 2 = 5, 3 = 4, 4 = 3, 5 = 2, 6 = 1, 7 = 0
	• Exercise	1 = No Exercise 2 = 1–2/week 3 = 3–4/week 4 = ≥5/week
	• Regular source of care	1 = No RSOC 2 = Self-treated 3 = Clinician in group practice 4 = Clinician independent of group practice 5 = Other SOC

(table continues)

Research Question	Variables	Measurement Scale & Description
Research Question 2: *Is there a relationship between physician assistants' prevention and counseling attitudes and their preventive medicine practices?*	**Outcome:** Preventive medicine practices	*Interval* 1 = Never 2 = Rarely 3 = Sometimes 4 = About half the time 5 = Often 6 = Usually 7 = Always
	Predictor: Prevention and counseling attitudes:	*Interval*
	• Perceived importance of delivering preventive care	1 = Very important 2 = Moderately important 3 = Somewhat important 4 = Not very important
	• Effectiveness of delivering preventive care (behavior change)	1 = Very effective 2 = Moderately effective 3 = Somewhat effective 4 = Minimally effective 5 = Do not counsel
	• Effectiveness of delivering preventive care (lifestyle counseling)	1 = Strongly agree 2 = Somewhat agree 3 = Neither agree nor disagree 4 = Somewhat disagree 5 = Strongly disagree
	• Comfort in delivering preventive care	1 = Strongly agree 2 = Somewhat agree 3 = Neither agree nor disagree 4 = Somewhat disagree 5 = Strongly disagree

(table continues)

Research Question	Variables	Measurement Scale & Description
Research Question 3: *Is there a relationship between physician assistants' perceived barriers to the delivery of clinical preventive services and their preventive medicine practices?*	**Outcome:** Preventive medicine practices	*Interval* 1 = Never 2 = Rarely 3 = Sometimes 4 = About half the time 5 = Often 6 = Usually 7 = Always
	Predictor: Perceived barriers to the delivery of clinical preventive services: • Lack of time • Lack of health educators • Insufficient reimbursement • Lack of tracking and prompting systems • Personal lack of interest • Lack of patient interest • uncertainty about what services to provide • Lack of patient education materials • Communication difficulties with patients • Cultural differences • Patient visit was for a different purpose	*Interval* 1 = Not important 2 = Minimally important 3 = Somewhat important 4 = Moderately important 5 = Very important

(table continues)

Research Question	Variables	Measurement Scale & Description
Research Question 4: *Is there a relationship between physician assistants' personal health habits and their prevention and counseling attitudes?*	**Outcome:** Prevention and counseling attitudes:	*Interval*
	• Perceived importance of delivering preventive care	1 = Very important 2 = Moderately important 3 = Somewhat important 4 = Not very important
	• Effectiveness of delivering preventive care (behavior change)	1 = Very effective 2 = Moderately effective 3 = Somewhat effective 4 = Minimally effective 5 = Do not counsel
	• Effectiveness of delivering preventive care (lifestyle counseling)	1 = Strongly agree 2 = Somewhat agree 3 = Neither agree nor disagree 4 = Somewhat disagree 5 = Strongly disagree
	• Comfort in delivering preventive care	1 = Strongly agree 2 = Somewhat agree 3 = Neither agree nor disagree 4 = Somewhat disagree 5 = Strongly disagree
	Predictor: Personal health habits:	*Ordinal, Interval, and Nominal*
	• Body mass index	Height and weight
	• Smoking status	1 = Never Smoked 2 = Former Smoker 3 = 1-10 cigarettes/day 4 = >10 cigarettes/day
	• Alcohol consumption	1 = No Alcohol 2 = 1–2 drinks/day 3 = 3–4 drinks/day 4 = ≥5 drinks/day

(table continues)

Research Question	Variables	Measurement Scale & Description
	• Diet	General Diet and Specific Diet (healthy) = Mean # of Days: 0 1 2 3 4 5 6 7 Specific Diet (unhealthy) = Mean # of Days (reverse): 0 = 7, 1 = 6, 2 = 5, 3 = 4, 4 = 3, 5 = 2, 6 = 1, 7 = 0
	• Exercise	1 = No Exercise 2 = 1–2/week 3 = 3–4/week 4 = ≥5/week
	• Regular source of care	1 = No RSOC 2 = Self-treated 3 = Clinician in group practice 4 = Clinician independent of group practice 5 = Other SOC
Research Question 5: *Is there a relationship between physician assistants' perceived barriers to the delivery of clinical preventive services and their prevention and counseling attitudes?*	**Outcome:** Prevention and counseling attitudes:	*Interval*
	• Perceived importance of delivering preventive care	1 = Very important 2 = Moderately important 3 = Somewhat important 4 = Not very important
	• Effectiveness of delivering preventive care (behavior change)	1 = Very effective 2 = Moderately effective 3 = Somewhat effective 4 = Minimally effective 5 = Do not counsel
	• Effectiveness of delivering preventive care (lifestyle counseling)	1 = Strongly agree 2 = Somewhat agree 3 = Neither agree nor disagree 4 = Somewhat disagree 5 = Strongly disagree
	• Comfort in delivering preventive care	1 = Strongly agree 2 = Somewhat agree 3 = Neither agree nor disagree 4 = Somewhat disagree 5 = Strongly disagree

(table continues)

Research Question	Variables	Measurement Scale & Description
	Predictor: Perceived barriers to the delivery of clinical preventive services: • Lack of time • Lack of health educators • Insufficient reimbursement • Lack of tracking and prompting systems • Personal lack of interest • Lack of patient interest • uncertainty about what services to provide • Lack of patient education materials • Communication difficulties with patients • Cultural differences • Patient visit was for a different purpose	*Interval* 1 = Not important 2 = Minimally important 3 = Somewhat important 4 = Moderately important 5 = Very important

Preventive medicine practices were measured by the behavior scale of the PMAAQ through 37 items across five Likert scales. Likewise, prevention and counseling attitudes were measured by the attitude scale of the PMAAQ through 36 items across four Likert scales. Lastly, perceived barriers to the delivery of clinical preventive services were measured by the barrier scale of the PMAAQ through 11 items across five Likert scales.

There is much debate about the nature and measurement level of Likert scales (Norman, 2010). One school-of-thought holds to the notion that Likert scale data is ordinal data, and therefore are analyzed nonparametrically (Norman, 2010). The other school argues that Likert scales are interval, because when well constructed, the distance between each value is equal (Norman, 2010), and as such, can be analyzed

parametrically. For the purpose of this research study, variables measured using Likert scales were considered interval. Interval data can be analyzed parametrically and nonparametrically, therefore providing diversity in the statistical analysis.

Pilot Testing

Despite the use of validated questionnaires and survey questions used in published research, review and pilot testing of the study questionnaire was conducted. The purpose of the review and pilot test was fourfold. First, to determine if the research instrument was comprehensive and appropriate (van Teijlingen & Hundley, 2002); second, to determine if questions were "well defined, clearly understood, and presented in a consistent manner" (Lancaster, Dodd, & Williamson, 2002, p. 309); third, to establish a minimum level of validity and reliability (van Teijlingen & Hundley, 2002), and lastly, to determine the feasibility of the study (van Teijlingen & Hundley, 2002). Although review and pilot testing do not guarantee success, they increase the likelihood and allow for changes to be made before the study is conducted (van Teijlingen & Hundley, 2002).

The questionnaire used in this study was designed using valid and reliable research instruments. However, as a standalone instrument, it had not been reviewed for appropriateness or established the necessary content validity and reliability required for doctoral research. Therefore, prior to the actual study, a preliminary draft of the questionnaire was distributed to a panel of four medical experts—two physician assistants, one registered nurse, and one primary care physician. Each expert was provided with the study's guiding questions and asked to review and evaluate the

competency, flow, ease, length, and completion time of the survey (Iraossi, 2006; see Table 5). Per their feedback, the questionnaire was modified.

Table 5

Medical Experts' Feedback Regarding the Study Questionnaire

Evaluation Question	PA #1	PA #2	RN	PCP
Is the survey competent in addressing the study's research questions?	"Yes, the research questions are addressed."	"Yes."	"Yes, it addresses the provider's personal health habits, their practice and their perceived barriers."	"The questionnaire is well written and competently addresses the research question posed."
Does the survey have a consistent flow? Is the transition from one question to the next seamless?	"The transition is perfect."	"Yes."	"Yes it was fluid, seamless and logical."	"Flows from one topic to another appropriately."
Are the questions comprehensible? Are there any ambiguities?	"Section 4, question 3, may be hard for survey participants to recall that data accurately, you might consider removing the 20%."	"PAs in any field other than primary care and internal medicine don't see patients for routine care…I am not sure how to word it so you get what you need, but think about it because the nature of the practice dictates the type of visits and how much "preventive" care is provided."	"I would have felt competent answering the questions without hesitancy."	"The last question posed is ambiguous. I believe it is aiming to discern if the items mentioned are potential barriers in one's practice. However, the question can easily be misunderstood for the opposite. You may want to consider changing the wording."
Is the survey's length appropriate?	"The length is good. I think there will be very few 'quitters'."	"Yes."	"Yes, it was comprehensive for the study question without redundancy."	"The length is appropriate."
Is the completion time (approximately 25 minutes) realistic? If no, what is a realistic time?	"I think 25 minutes is realistic prediction. Depending on the participant's practice habits, it could be finished in less time."	"Yes- actually didn't take that long"	"Without actually answering each question, it took me less than 15 minutes to read. 25 minutes should be enough time to complete all the questions."	"Very possible to complete it in under 25 minutes."
Are there any other points/changes/suggestions that should be considered?	"I don't mind being asked personal or professional questions, but I would like to know how that information is relevant to the study."	"I am not sure how to define "effective"- I suspect most folks are going to say "minimally effective" Good follow up questions on this same topic so it may be okay."	"When I receive a request for participation in a survey, I am willing if it seems legitimate. The info you offered, along with your credentials would have sufficed for me."	"Is to possible request information regarding BMI? This will help you better understand the health status of those taking the survey."

Note. PA = Physician Assistant; RN = Registered Nurse; PCP = Primary Care Physician.

The modified version was piloted on a sample of physician assistants obtained through the Arizona 2014 Medical Directory of Physicians and Physician Assistants (Arizona Regulatory Board of Physician Assistants [ARBoPA], 2014). In order to be included in the pilot study, participants had to have a valid Arizona physician assistant license and practice outside of the state. After data cleansing and address verification, there were 157 physician assistants that met the inclusion requirements. Each eligible physician assistant was sent an informed consent/introduction letter (Appendix C) and asked to complete the survey (Appendix D) online. After the first mailing, 1.9% (n = 3) of the surveys were completed and 7.6% (n = 12) of the mailed invitations were returned. Those who did not respond were sent two follow-up reminder cards (Appendix E). At the conclusion of the collection period (March 31, 2014–May 15, 2014), only six physician assistants completed the survey, for a response rate of 3.8% (see Figure 3). Although the pilot study indicated the study was feasible and the questions were appropriate, the lack of responses was alarming and reason for concern.

There were no additional modifications made to the questionnaire after the pilot test; however, the study design was drastically modified. Initially, the proposed study was to survey licensed physician assistants currently practicing in the state of Arizona (n = 1,772; ARBoPA, 2014). However, after the low response rate obtained during the pilot study, the decision was made to conduct the survey in person at the AAPA 42nd Annual Conference in Boston, Massachusetts.

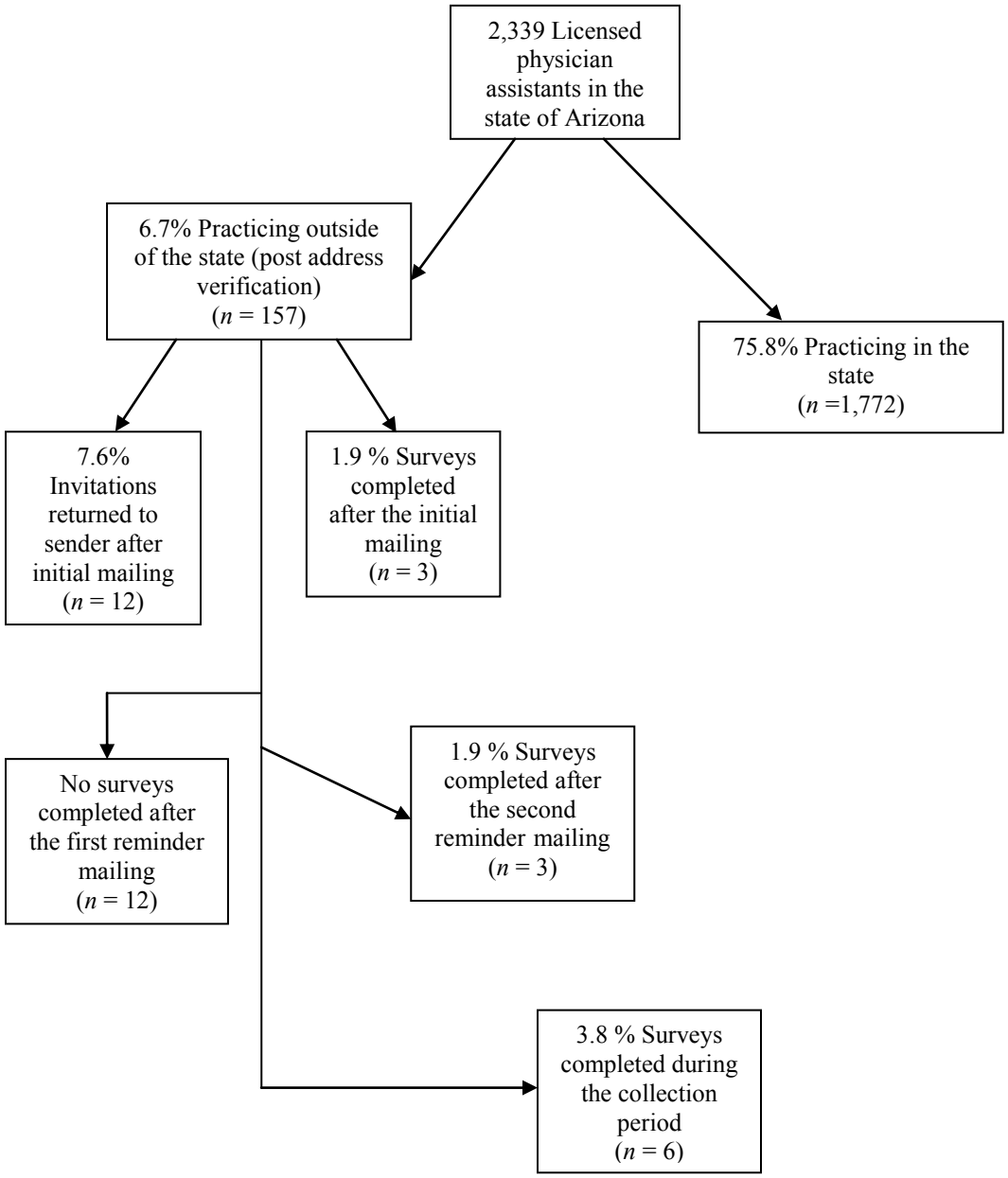

Figure 3. Pilot study flow chart.

Data Collection

Survey participants were drawn from the AAPA 42nd Annual Conference in Boston, Massachusetts, May 24–28, 2014. Participant recruitment was conducted May 27–28, 2014, during the 2-day exposition. Physician assistants who approached the Physician Assistant Preventive Medicine Practices' booth (#749; Appendix B)—located in the nonprofit section of the exhibit hall—were asked to participate.

Participants were given a study introduction/consent form (Appendix C), questionnaire booklet (Appendix D), and the option to sit at a conference style table or stand while taking the survey. Participants were instructed to place their completed surveys in a mailbox located at the edge of the table. There were 309 surveys returned using this method; an additional five surveys were completed online through SurveyMonkey, for a total of 314 returned surveys. Participants who completed the survey online were instructed to read an introductory letter and consent to taking the survey. Completion of the survey, via either method, indicated the participant (a) read the study introduction/consent form, (b) understood the study well enough to make an informed decision about their participation, and (c) agreed to participate.

Upon completion of the survey, in-person participants were verbally thanked for their time, whereas online participants were directed to a 'Thank You' page (Appendix F). As an incentive for completing the survey, participants were given information (Appendix G) on how they could request a free copy of the latest Guide to Clinical Preventive Services and/or download the free Electronic Preventive Services Selector (ePSS). Both resources are published by the Agency for Healthcare Research and Quality

(AHRQ) and allow clinicians to identify clinical preventive services that are appropriate for their patients.

Statistical Analysis

Data obtained from the study were analyzed with the statistical software package, IBM SPSS Statistics 21. SPSS gives researchers a wide range of statistics, allowing them to perform a number of statistical and analytical procedures that clarify relationships between variables and assists them in making predictions (IBM, 2011). Based on the assumption that the study population was normally distributed, data analysis included descriptive and inferential statistical analyses. Descriptive analysis, including frequency distribution and measures of central tendency and dispersion, were used to provide an overview of the study participants. Chi-square (X^2) analysis was used to provide probabilities based on the frequency of variables.

Inferential analysis was used to address the research questions, test the hypotheses that drove the study, and make inferences about the data results. One-way analysis of variance (ANOVA) and independent-samples *t* test were used to examine physician assistants' personal and professional characteristics on reported levels of preventive medicine practices, prevention and counseling attitudes, and perceived barriers. Pearson's and Spearman's correlations were used to examine the relationships between each of the independent variables and the dependent variable. Lastly, because there were a number of explanatory variables, regression analysis—simple linear and stepwise multiple—was used to examine the predictive relationships between physician assistants' preventive medicine practices and their personal health habits, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services. In order to properly

manage the data used for regression analysis, dummy coding (1 = presence of a trait and 0 = absence of a trait) was used. Table 6 shows the statistical analysis used for each research question and study variable.

Table 6

Statistical Analysis

Research Question and Hypotheses	Variables	Statistical Analysis
RQ1. *Is there a relationship between physician assistants' personal health habits and their preventive medicine practices?* *H_1: There is a significant relationship between physician assistants' personal health habits and their preventive medicine practices.* *H_{01}: There is no significant relationship between physician assistants' personal health habits and their preventive medicine practices.*	**Outcome:** Preventive medicine practices **Predictor:** Personal health habits: • Body mass index • Smoking status • Alcohol consumption • Diet • Exercise • Regular source of care	Pearson and Spearman correlations; stepwise multiple regression
RQ2. *Is there a relationship between physician assistants' prevention and counseling attitudes and their preventive medicine practices?* *H_2: There is a significant relationship between physician assistants' prevention and counseling attitudes and their preventive medicine practices.* *H_{02}: There is no significant relationship between physician assistants' prevention and counseling attitudes and their preventive medicine practices.*	**Outcome:** Preventive medicine practices **Predictor:** Prevention and counseling attitudes: • perceived importance of delivering preventive care • effectiveness of delivering preventive care (behavior change) • effectiveness of delivering preventive care (lifestyle counseling) • comfort in delivering preventive care	Pearson correlation; simple linear regression; stepwise multiple regression

(table continues)

Research Question and Hypotheses	Variables	Statistical Analysis
RQ3. *Is there a relationship between physician assistants' perceived barriers to the delivery of clinical preventive services and their preventive medicine practices?* *H_3: There is a significant relationship between physician assistants' perceived barriers to the delivery of clinical preventive services and their preventive medicine practices.* *H_{03}: There is no significant relationship between physician assistants' perceived barriers to the delivery of clinical preventive services and their preventive medicine practices.*	**Outcome:** Preventive medicine practices **Predictor:** Perceived barriers to the delivery of clinical preventive services: • lack of time • lack of health educators • insufficient reimbursement • lack of tracking and prompting systems • personal lack of interest • lack of patient interest • uncertainty about services to provide • lack of patient education materials • communication difficulties with patients • cultural differences • patient visit was for a different purpose	Pearson correlation; simple linear regression; stepwise multiple regression
RQ4. *Is there a relationship between physician assistants' personal health habits and their prevention and counseling attitudes?* *H_4: There is a significant relationship between physician assistants' personal health habits and their prevention and counseling attitudes.* *H_{04}: There is no significant relationship between physician assistants' personal health habits and their prevention and counseling attitudes.*	**Outcome:** Prevention and counseling attitudes: • Perceived importance of delivering preventive care • Effectiveness of delivering preventive care (behavior change) • Effectiveness of delivering preventive care (lifestyle counseling) • Comfort in delivering preventive care **Predictor:** Personal health habits: • Body mass index • Smoking status • Alcohol consumption • Diet • Exercise • Regular source of care	Pearson and Spearman correlations

(table continues)

Research Question and Hypotheses	Variables	Statistical Analysis
RQ5: *Is there a relationship between physician assistants' perceived barriers to the delivery of clinical preventive services and their prevention and counseling attitudes?* *H_5: There is a significant relationship between physician assistants' perceived barriers to the delivery of clinical preventive services and their prevention and counseling attitudes.* *H_{05}: There is no significant relationship between physician assistants' perceived barriers to the delivery of clinical preventive services and their prevention and counseling attitudes.*	**Outcome:** Prevention and counseling attitudes: • Perceived importance of delivering preventive care • Effectiveness of delivering preventive care (behavior change) • Effectiveness of delivering preventive care (lifestyle counseling) • Comfort in delivering preventive care **Predictor:** Perceived barriers to the delivery of clinical preventive services: • Lack of time • Lack of health educators • Insufficient reimbursement • Lack of tracking and prompting systems • Personal lack of interest • Lack of patient interest • uncertainty about services to provide • Lack of patient education materials • Communication difficulties with patients • Cultural differences • Patient visit was for a different purpose	Pearson correlation

Protection of Participants' Rights

This research involved the use of human participants; however, due to the study's nonexperimental design, there were no interventions or treatments provided. Participation was voluntary and participants had the opportunity to withdraw from the study at any time.

Informed Consent

Prior to beginning the questionnaire, participants were asked to read and agree to the terms provided in the consent form (Appendix C). Participants were given knowledge of the study's purpose, voluntary nature of the study, risks and benefits of participating, statement on confidentiality, and contact information of the primary researcher, researcher's dissertation chair, and university's IRB representative.

Participants were informed that their responses were anonymous and confidential. They were also notified that data obtained from the study would be housed on a secure server through SurveyMonkey, and kept on a flash drive stored in a locked file cabinet for a period of five years, as required by Walden University. Additionally, they were informed that access to the survey responses was limited to the researcher and dissertation committee. Lastly, participants were advised that the final dissertation would be published by *ProQuest UMI Dissertation Publishing*, and that study results would be included in manuscripts submitted to professional journals for publication; however, the information published would be general in nature.

Summary

The purpose of this study was to examine the relationship between physician assistants' preventive medicine practices, personal health habits, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services. Although medical professionals have low response rates (Flanigan et al., 2008), as seen in the pilot study, the use of a cross-sectional survey provided an easy and convenient way to access and describe the population, answer secondary research questions, and test hypotheses (Bowling, 2002).

This study effects positive social change in that it closes a research gap; provides descriptive information on the personal and professional characteristics of physician assistants; reveals their personal health habits; draws attention to their preventive medicine practices, attitudes, and beliefs; encourages professional development and curriculum change in physician assistant training programs, and can be used to improve patient outcomes. Chapter 4 presents the study results and Chapter 5 highlights recommendations for physician assistant practice, social change implications, and future research.

Chapter 4: Results

Introduction

The purpose of this study was to determine the relationship between physician assistants' preventive medicine practices, personal health habits, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services; a secondary objective was to predict physician assistants' counseling practices. Because physician assistants are expected to provide health promotion and disease prevention in their practice of medicine, knowledge of this relationship could provide a foundation for professional development and curriculum changes in physician assistant training programs, which may translate to improved health care practices and better patient outcomes.

Chapter 4 details the study's research findings and is divided into the following sections: research questions and hypotheses, instrumentation, pilot study, data collection, demographic data, study results, and summary. The chapter begins with a reiteration of the research questions and hypotheses that drove the study, followed by a description of the instrument used, and results of the pilot study. Next, participant recruitment and categorization of respondents are discussed. The chapter continues with demographic data for the participants' personal and professional characteristics, and study results, including a presentation of the statistical analyses used to examine the hypotheses and answer the research questions. Lastly, the chapter concludes with an overview of the findings and an introduction to Chapter 5.

Research Questions and Hypotheses

In order to investigate the relationship between physician assistants' preventive medicine practices, personal health habits, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services, the following research questions were posed and hypotheses tested:

Research Question 1: Is there a relationship between physician assistants' personal health habits (body mass index, tobacco use, alcohol consumption, diet, physical activity, and regular source of care) and their preventive medicine practices?

H_1: There is a significant relationship between physician assistants' personal health habits and their preventive medicine practices.

H_{01}: There is no significant relationship between physician assistants' personal health habits, as measured by the SDSCA, The Cardiologists' Lifestyle Survey, and RSOC instruments, and their preventive medicine practices, as measured by the behaviors scale of the PMAAQ instrument.

Research Question 2: Is there a relationship between physician assistants' prevention and counseling attitudes (perceived importance of, effectiveness of, and comfort in delivering preventive care) and their preventive medicine practices?

H_2: There is a significant relationship between physician assistants' prevention and counseling attitudes and their preventive medicine practices.

H_{02}: There is no significant relationship between physician assistants' prevention and counseling attitudes, as measured by the attitudes scale of the PMAAQ instrument, and their preventive medicine practices, as measured by the behaviors scale of the PMAAQ instrument.

Research Question 3: Is there a relationship between physician assistants' perceived barriers to the delivery of clinical preventive services and their preventive medicine practices?

H_3: There is a significant relationship between physician assistants' perceived barriers to the delivery of clinical preventive services and their preventive medicine practices.

H_{03}: There is no significant relationship between physician assistants' perceived barriers to the delivery of clinical preventive services, as measured by the barriers scale of the PMAAQ instrument, and their preventive medicine practices, as measured by the behaviors scale of the PMAAQ instrument.

Research Question 4: Is there a relationship between physician assistants' personal health habits (body mass index, tobacco use, alcohol consumption, diet, physical activity, and regular source of care) and their prevention and counseling attitudes (perceived importance of, effectiveness of, and comfort in delivering preventive care)?

H_4: There is a significant relationship between physician assistants' personal health habits and their prevention and counseling attitudes.

H_{04}: There is no significant relationship between physician assistants' personal health habits, as measured by the SDSCA, The Cardiologists' Lifestyle Survey, and RSOC instruments, and their prevention and counseling attitudes, as measured by the attitudes scale of the PMAAQ instrument.

Research Question 5: Is there a relationship between physician assistants' perceived barriers to the delivery of clinical preventive services and their prevention and

counseling attitudes (perceived importance of, effectiveness of, and comfort in delivering preventive care)?

H_5: There is a significant relationship between physician assistants' perceived barriers to the delivery of clinical preventive services and their prevention and counseling attitudes.

H_{05}: There is no significant relationship between physician assistants' perceived barriers to the delivery of clinical preventive services, as measured by the barriers scale of the PMAAQ instrument, and their prevention and counseling attitudes, as measured by the attitudes scale of the PMAAQ instrument.

Instrumentation

A 104-item research instrument, PAPMPQ (Appendix D), was used to assess participants' personal and professional characteristics, self-reported health habits, preventive medicine behaviors, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services. The instrument included measures from Yeazel et al. (2006); Toobert et al. (2000); Abuissa et al. (2006), and Gross et al. (2000), and was modified to reflect the study population.

Pilot Study

Participants for the pilot test were obtained through the Arizona 2014 Medical Directory of Physicians and Physician Assistants. There were 157 physician assistants included in the pilot study. At the conclusion of the collection period (March 31, 2014–May 15, 2014) only six physician assistants had completed the survey, for a response rate of 3.8%. Of the respondents, 33.3% (n = 2) were male and 66.7% (n = 4) were female; 83.3% (n = 5) were White; half (n = 3) were between the age of 31 and 45 and the other

half (n = 3) were between the age of 46 and 64; half (n = 3) had been licensed for 10 years or less and the other half (n = 3), for 11 years or more. Five (83.3%) worked in specialties other than primary care; half (n = 3) worked in a physician group or solo practice; 66.7% (n = 4) worked between 30–40 hours per week, and most (66.7%) saw 10–20 patients a day. All respondents (n = 6) were currently treating adult patients.

Instrument Reliability

Of the 84 items that measured preventive medicine practices, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services, all were answered by 83.3% (n = 5) of respondents; 16.7% (n = 1) of respondents answered all items except for the 15 that assessed the importance for physician assistants to counsel patients on health promotion and disease prevention topics. Overall, these results suggest the research instrument was comprehensive, appropriate, and clearly understood.

Reliability analysis for each scale (behavior, attitude, and barrier) was investigated with Cronbach's alpha (α). Each scale showed a high level of internal consistency: behavior, α = .90; attitude, α = .80, and barrier, α = .81 (see Table 7). Results indicate the items on each scale appropriately measured the same underlying dimension. Therefore, no modifications to the instrument were necessary.

Table 7

Reliability Coefficients

Theme/Scale/Subscale	*N* of Items	Cronbach's Alpha (α)
Behavior Scale	37	.90
Attitude Scale	36	.80
Barrier Scale	11	.81

Data Collection

Data were obtained from physician assistants attending the AAPA 42nd Annual Conference. Participant recruitment was conducted May 27–28, 2014, during the 2-day exposition. Physician assistants who approached the Physician Assistant Preventive Medicine Practices' booth (#749; Appendix B)—located in the nonprofit section of the exhibit hall—were asked to participate in the study. There were 5,836 conference attendees; 314 participated in the study, for a response rate of 5.4%. Respondents not actively managing patients (n = 14) were asked to complete Sections 1, 2 and a portion of Section 3 of the PAPMPQ. Of the remaining respondents (n = 300), those who did not treat adult patients (n = 14) completed Sections 1, 2, and 3 of the questionnaire, and were excluded from Sections 4 and 5. A total of 91% of respondents (n = 286) were actively treating adult patients and thus qualified to complete Sections 4 and 5 of the questionnaire, in addition to Sections 1, 2, and 3. Figure 4 illustrates the categorization of respondents.

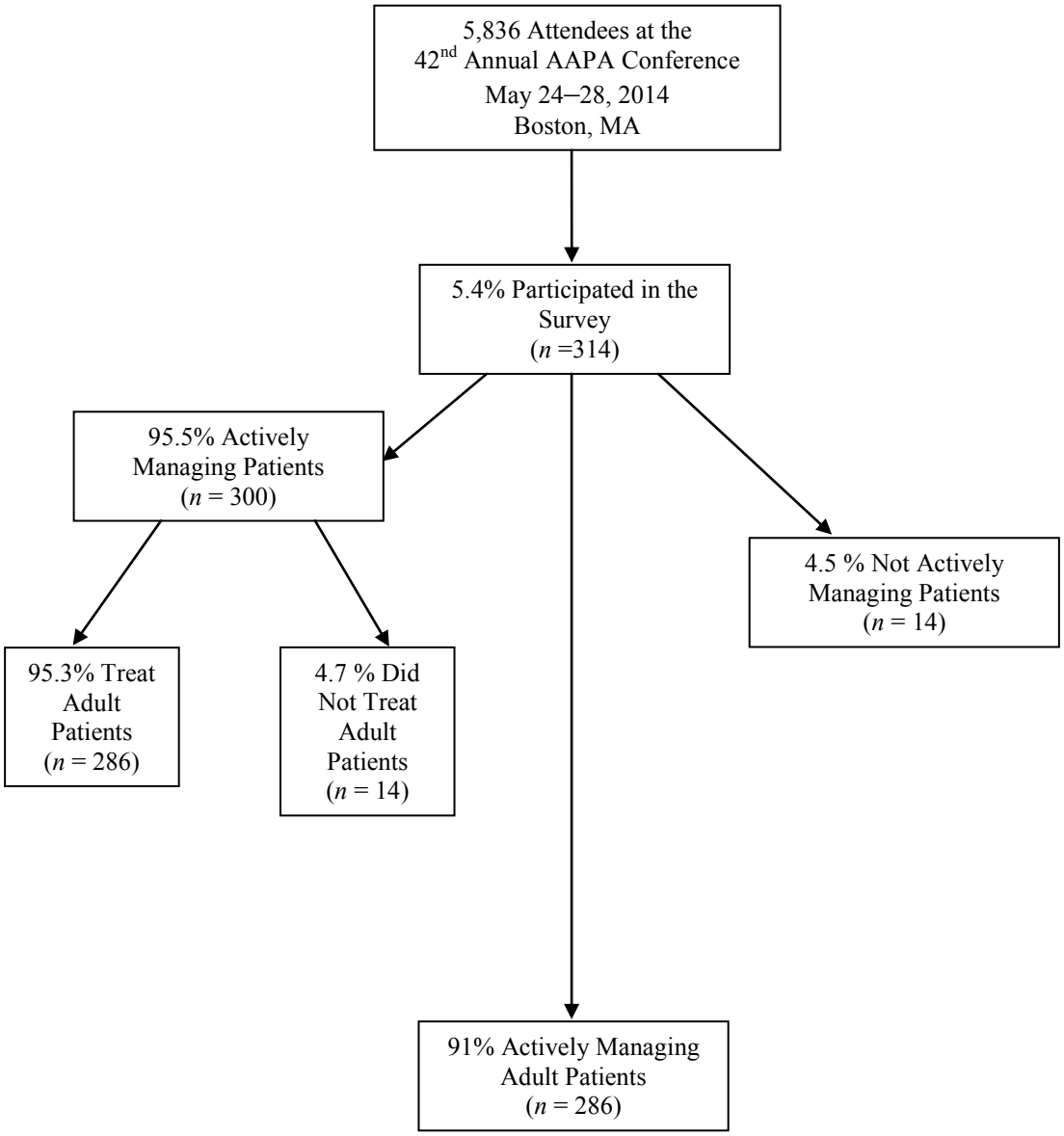

Figure 4. Categorization of survey respondents.

Demographic Data

Personal and Professional Characteristics

Sections 1 and 3 of the research instrument asked participants about their demographic—personal and professional—characteristics. According to the results in Table 8, approximately 31.8% (*n* = 100) were male and 66.6% (*n* = 209) were female; 74.5% (*n* = 234) were White, 10.5% (*n* = 33) were Black, and 12.5% (*n* = 39) were of other races/ethnicities; 66.5% (*n* = 209) were 45 or younger and 31.6% (*n* = 99) were 46 or older. As shown in Table 9, little over half (59.2%) were licensed for 10 or fewer years; most (60.5%) worked in specialties other than primary care, and the majority (95.5%) were actively managing patients. Of those actively managing patients (*n* = 300), more than half (65%) practiced in the Northeast and South regions of the United States; slightly more than half (60.7%) practiced in nonhospital environments, worked more than 40 hours per week (58%) and saw 10–20 patients a day (55.7%).

Table 8

Demographic Data for Physician Assistants' Personal Characteristics

Characteristic	*N* = 314	%
Gender		
Male	100	31.8
Female	209	66.6
Unknown	5	1.6
Race/Ethnicity[a]		
Asian	10	3.2
Black/African American	33	10.5
Hispanic/Latino	16	5.1
White/Caucasian, not Hispanic	234	74.5
Other/Unknown	21	6.7
Age[b]		
30 or younger	89	28.3
31–45	120	38.2
46–64	95	30.3
Other/Unknown	10	3.2

[a] Other/Unknown: American Indian or Alaska Native (1); Native Hawaiian or Other Pacific Islander (3); Multi-racial/Multi-ethnic (9); Unknown (8)
[b] Other/Unknown: 65 or older (4); Unknown (6)

Table 9

Demographic Data for Physician Assistants' Professional Characteristics

Characteristic	*N* = 314	%
Years licensed as a physician assistant		
Less than 5 years	119	37.9
5–10 years	67	21.3
11–20 years	76	24.2
More than 20 years	46	14.6
Unknown	6	1.9
Primary specialty		
Primary Care[a]	117	37.3
Internal Medicine Subspecialties	39	12.4
Emergency Medicine	20	6.4
Surgical Subspecialties	76	24.2
Other Specialties	55	17.5
Unknown	7	2.2
Actively managing patients		
Yes	300	95.5
No	14	4.5
Practice region[b]		
Northeast	101	32.2
Midwest	46	14.6
South	94	29.9
West	48	15.3
Other/U.S. Territory/Unknown[c]	25	8.0
Practice environment		
Hospital	115	36.6
Physician Group or Solo Practice	120	38.2
Community Health Center	32	10.2
Certified Rural Health Clinic	13	4.1
Other	17	5.4
Unknown[c]	17	5.4

(table continues)

Characteristic	*N* = 314	%
Hours worked per week		
Less than 20	17	5.4
21–30	13	4.1
31–40	93	29.6
More than 40	174	55.4
Unknown[c]	17	5.4
Patients seen daily		
Less than 10	29	9.2
10–20	167	53.2
21–30	72	22.9
More than 30	27	8.6
Unknown[c]	19	6.1
Treat adult patients[d]		
Yes	286	95.3
No	14	4.7

[a] Primary Care includes: Family Medicine, Urgent Care, General Internal Medicine, General Pediatrics and OB/GYN.
[b] Regions according to the U.S. Census: Northeast (*CT, MA, ME, NH, NJ, NY, PA, RI, VT*); Midwest (*IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, SD, WI)*; South *(AL, AR, DC, DE, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA, WV)*; West *(AK, AZ, CA, CO, HI, ID, MT, NM, NV, OR, UT, WA, WY)*; Other/U.S. Territory *(Am. Samoa; Guam; Northern Mariana Islands; U.S. Virgin Islands)*.
[c] Includes physician assistants excluded because they are not actively managing patients (n = 14).
[d] Only includes physician assistants who are actively managing patients (n = 300).

Study Results

Self-Reported Personal Health Habits

Table 10 summarizes the self-reported health habits of the participants, while Table 11 summarizes the mean statistics for participants' body mass index (BMI) and diet-related health habits. Data for both tables were assessed by Section 2 of the research instrument. The majority of participants (78.3%) had a regular source of care. Slightly less than half (47.1%) were normal weight, 30.9% were overweight, and 20.1% were obese; the mean BMI was 26.22 kg/m^2, which suggests that as a whole, the average physician assistant is slightly overweight. Less than half (42%) followed a healthful eating plan at least five days a week; the mean was 4.05 days. Only 35% (n = 111) ate five or more servings of fruits and vegetables on five or more days; the mean was 3.66 days. The mean number of days of high-fat foods was relatively low (M = 2.83); most participants (80.5%) ate high-fat foods on four or fewer days per week. More than half (58.9%) exercised at least three times per week. Majority (86.3%) reported no history of tobacco use and 1% (n = 3) were current smokers; over half (62.1%) consumed 1-4 alcoholic beverages per week and 28.7% did not drink. Univariate chi-square tests used to determine if an association existed between frequencies for each category revealed a statistically significant difference ($p < .001$) for each characteristic listed in Table 10, with the exception of eating five or more servings of fruits and vegetables, $\chi^2(2, N = 308)$ 1.25, $p = .534$.

Table 10

Descriptive Statistics for Physician Assistants' Self-Reported Personal Health Habits

Characteristic	*N* = 314	%	*p**
Body Mass Index[a]			.000
Underweight (< 18.5 kg/m^2)	0	0.0	
Normal Weight (18.5–24.9 kg/m^2)	148	47.1	
Overweight (25.0–29.9 kg/m^2)	97	30.9	
Obese (≥30 kg/m^2)	63	20.1	
Unknown	6	1.9	
Smoking status[b]			.000
Never smoked	271	86.3	
Former smoker	35	11.1	
Other/Unknown	8	2.6	
Exercise status			.000
No exercise	24	7.6	
1–2 times per week	100	31.8	
3–4 times per week	134	42.7	
≥ 5 times per week	51	16.2	
Unknown	5	1.6	
Alcohol consumption			.000
No alcohol	90	28.7	
1–2 drinks per week	123	39.2	
3–4 drinks per week	72	22.9	
≥ 5 drinks per week	22	7.0	
Unknown	7	2.2	
Healthful eating plan			.000
0–2 days	66	21.0	
3–4 days	108	34.4	
5–7 days	132	42.0	
Unknown	8	2.5	

(table continues)

Characteristic	*N* = 314	%	*p**
Five or more servings of fruits and vegetables			.534
0–2 days	95	30.3	
3–4 days	102	32.5	
5–7 days	111	35.4	
Unknown	6	1.9	
High-fat foods			.000
0–2 days	154	49.0	
3–4 days	99	31.5	
5–7 days	56	17.8	
Unknown	5	1.6	
Regular Source of Care[c]			.000
No RSOC	62	19.7	
RSOC	246	78.3	
Unknown	6	1.9	

[a] Body Mass Index was calculated from respondents' height (in feet and inches) and weight (in pounds).
[b] Other/Unknown: 1-10 cigarettes per day (3); unknown (5)
[c] Regular Source of Care categories have been compressed. Respondents who answered 'No or 'Self-treated' are classified as 'No RSOC'; respondents who answered 'Clinician in own group practice', 'Clinician independent of group practice', or 'Other source of care' are classified as 'RSOC'.
**Note. p* value <0.05 is considered statistically significant.

Table 11

Mean Statistics for Physician Assistants' Body Mass Index and Diet-Related Health Habits

Health Habit	*N*	Min	Max	*Mean*	*SD*
Body Mass Index[a]	308	18.4	43.0	26.22	5.05
Healthful Eating Days	306	0	7	4.05	2.07
5+ Servings of Fruits and Vegetables	308	0	7	3.66	2.16
High-Fat Foods	309	0	7	2.83	1.76

[a] Body Mass Index was calculated from respondents' height (in feet and inches) and weight (in pounds).

Preventive Medicine Practices

Preventive medicine practices were assessed with the behavior scale of the PMAAQ. The scale consists of 37 items across three scales—overall prevention, smoking cessation, and hypertension management—and five subscales—primary prevention, cardiovascular (CVD) prevention, harmful activities, substance use, and cancer screening—rated on a 7-point Likert scale: *never (0%), rarely (1–20%), sometimes (21–40%), about half the time (41–60%), often (61–80%), usually (81–99%), and always (100%)*. Higher numbers indicate greater frequency of preventive services delivery.

Any adult patient. As shown in Table 12, fifteen items assessed preventive medicine practices with any adult patient. Results imply that physician assistants incorporated preventive medicine with any adult patient only sometimes (M = 57.34); the highest possible score was 105. Accordingly, physician assistants reported they usually asked about tobacco use (M = 5.93); often asked about illicit drug use (M = 5.23) and alcohol use (M = 5.13); asked about exercise (M = 4.54), diet (M = 4.48), and symptoms of depression (M = 3.95) about half the time; sometimes asked about immunization history (M = 3.71), screening for colon cancer (M = 3.68), pap smear history (M = 3.55), mammogram history (M = 3.54), contraception use (M = 3.28), and the number of recent partners (M = 2.95); rarely asked about oral health care (M = 2.80) or seatbelt use (M = 2.51), and almost never asked about smoke detectors in the home (M = 1.90).

Asymptomatic adult patient with no significant past medical history. Table 12 shows the four items that measured preventive medicine practices with asymptomatic adult patients with no significant past medical history. Results indicate that physician assistants sometimes advised patients on health promotion and disease prevention topics

(M = 15.28); the highest possible score was 28. They reported advising patients to exercise regularly (M = 4.67), increase consumption of fruits and vegetables (M = 4.16), and decrease dietary fat consumption (M = 4.01) about half the time, and rarely advised them always to use a seatbelt (M = 2.48).

Overweight adult patient. Seven items evaluated preventive medicine practices with overweight adult patients. Physician assistants provided preventive medicine services about half the time (M = 29.48); the highest score possible was 49. They often advised patients to exercise regularly (M = 5.03); decrease caloric intake (M = 4.73), decrease dietary fat consumption (M = 4.32), set a weight loss goal (M = 4.14), get a glucose test for diabetes (M = 4.03), and set specific exercise goals (M = 3.94) about half the time, and perform specific exercises (M = 3.45) some of the time (see Table 12).

Adult patient who smoked cigarettes. Table 12 reveals the seven items used to measure preventive medicine practices with adult patients who smoked cigarettes. Results indicate that overall, physician assistants engaged in preventive medicine activities some of the time (M = 24.28); the highest score possible was 49. They usually advised patients to quit smoking (M = 6.00) and advised setting a specific *quit date* (M = 4.09) about half the time. They provided self-help materials (M =3.28), prescribed nicotine patches and gum (M = 3.12), and prepared patient for withdrawal symptoms (M = 3.00) some of the time. Rarely did they refer patients to a cessation program (M = 2.87) and almost never had a staff member call the patient a week after setting a quit date (M = 1.91).

Adult patient with high blood pressure. As shown in Table 12, four items assessed preventive medicine practices with hypertensive patients. Physician assistants

provided preventive medicine services about half the time (M = 19.45); the highest score possible was 28. They often talked about the importance of taking medication regularly (M = 5.22) and reviewed health risks of hypertension (M = 4.87), advised weight loss for overweight patients (M = 4.81), and advised salt reduction (M = 4.55) about half the time.

Table 12

Means of PMAAQ Behavior Scale Items

	N	*M*	*SD*
Any Adult Patient	**253**	**57.34**	**19.61**
Alcohol Use	279	5.13	1.80
Diet	279	4.48	1.83
Exercise	277	4.54	1.88
Immunization History	278	3.71	2.04
Oral Health Care	275	2.80	1.68
Screening for Colon Cancer	277	3.68	2.19
Seatbelt Use	277	2.51	1.81
Number of Recent Sexual Partners	278	2.95	1.85
Contraception Use	279	3.28	1.99
Smoke Detectors in the Home	278	1.90	1.48
Symptoms of Depression	279	3.95	1.98
Tobacco Use	279	5.93	1.52
Illicit Drugs	275	5.23	1.82
Pap Smear History	271	3.55	2.33
Mammogram History	271	3.54	2.35
Asymptomatic Patient With No Past Medical History	**272**	**15.28**	**6.62**
Exercise Regularly	274	4.67	1.91
Increase Consumption of Fruits and Vegetables	273	4.16	2.04
Decrease Dietary Fat Consumption	274	4.01	2.00
Always Use a Seatbelt	273	2.48	1.95
Overweight Patient	**271**	**29.48**	**12.27**
Exercise Regularly	277	5.03	1.85
Decrease Caloric Intake	275	4.73	1.98
Set s Goal for Weight Loss	275	4.14	2.08
Decrease Dietary Fat Consumption	276	4.32	2.12
Get a Plasma Glucose Test for Diabetes	276	4.03	2.16
Set Specific Exercise Goals	277	3.94	2.08
Perform Specific Exercises	277	3.45	2.04
Patient who Smoked Cigarettes	**270**	**24.28**	**9.90**
Advise Patient to Quit Smoking	275	6.00	1.53
Advise Setting a Specific "Quit Date"	276	4.09	2.16
Have Staff Call Patient a Week After Quit Date	276	1.91	1.65
Refer Patient to a Cessation Program	274	2.87	2.02
Prepare Patient for Withdrawal Symptoms	274	3.00	1.91
Prescribe Nicotine Patch/Gum	274	3.12	1.20
Provide Self-Help Materials	271	3.28	2.18
Hypertensive Patient	**277**	**19.45**	**7.63**
Review Health Risks of Hypertension	278	4.87	2.02
Advise Weight Loss for Overweight Patients	277	4.81	2.09
Advise Salt Reduction	278	4.55	2.12
Discuss Importance of Taking Medication Regularly	278	5.22	1.97

Collective preventive medicine practices. In general, physician assistants employed preventive medicine practices (*M* = 143.28), overall prevention (*M* = 100.37), primary prevention (*M* = 69.1), and CVD prevention (*M* = 46.59) about half the time (41–60%); asked about harmful activities (*M* = 16.50) about half the time (41–60%) and substance use (*M* = 16.21) often (61–80%); encouraged cancer screening (*M* = 10.54) and promoted smoking cessation (*M* = 24.12) some of the time (21–40%), and provided hypertension management (*M* = 19.43) about half the time (41–60%; see Table 13).

Table 13

Means of Behavior Scale and Subscale Summary Scores

	N	Min	Max	*Mean*	*SD*
Behavior Scale	**281**	**37**	**255**	**143.28**	**48.26**
Overall Prevention Behavior	281	26	178	100.37	34.57
Primary Prevention	281	16	110	69.17	21.95
CVD Prevention	281	5	77	46.59	18.36
Harmful Activities	279	4	28	16.50	5.53
Substance Use	279	3	21	16.21	4.55
Cancer Screening	279	1	21	10.54	6.25
Smoking Cessation	276	7	49	24.12	9.87
Hypertension Management	278	4	28	19.43	7.62

Difference between the means. Independent-samples *t* test and ANOVA were conducted to determine if differences between the means of physician assistants' preventive medicine practice scores by personal and professional characteristics existed. Mean tables are only reported if a statistically significant difference was found.

Gender. The independent-samples *t test* for gender revealed no statistically significant difference ($p > .05$) in the preventive medicine practice scores of men and women (see Table 14).

Table 14

Independent-Samples t test for Preventive Medicine Practice Scores by Gender

		Levene's Test for Equality of Variances		*t* test for Equality of Means						
		F	Sig.	*t*	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval	
									Lower	Upper
Behavior Score	Equal variances assumed	2.552	.111	-.626	274	.532	-3.917	6.255	-16.232	8.398
Overall Prevention Behavior Score	Equal variances assumed	.241	.624	-.580	274	.562	-2.596	4.474	-11.403	6.211
Primary Prevention Score	Equal variances assumed	.187	.666	-.533	274	.595	-1.513	2.841	-7.105	4.080
CVD Prevention Score	Equal variances assumed	3.368	.068	-.209	274	.835	-.496	2.380	-5.181	4.188
Harmful Activities Score	Equal variances assumed	.065	.799	-.758	272	.449	-.540	.713	-1.945	.864
Substance Use Score	Equal variances not assumed	4.022	.046	-.085	139.37	.932	-.055	.641	-1.323	1.213
Cancer Screening Score	Equal variances assumed	.069	.793	-1.351	272	.178	-1.092	.808	-2.682	.499
Smoking Cessation Score	Equal variances not assumed	8.952	.003	.636	132.18	.526	.905	1.423	-1.910	3.721
Hypertension Management Score	Equal variances assumed	.629	.428	-.578	271	.563	-.580	1.002	-2.553	1.394

Note. 'Equal variances not assumed' indicates the assumption of homogeneity was violated. Therefore Welch *t*-test results were used.

Race/ethnicity. The results of the ANOVA in Table 16 revealed no statistically significant difference ($p > .05$) in preventive medicine practice scores by race/ethnicity, except for overall prevention behavior score, $F(4, 269) = 2.570$ $p = .038$, and harmful activities score, $F(4, 267) = 2.785$, $p = .027$. Physician assistants identifying as Hispanic/Latino scored higher than physician assistants identifying as White/Caucasian on overall prevention behavior ($M = 126.93$ vs. $M = 98.32$, respectively) and harmful activities ($M = 20.43$ vs. $M = 16.06$, respectively; see Table 15). Post-hoc analysis, Tukey HSD, indicated the mean differences between the two race/ethnicity categories related to overall prevention behavior and harmful activities scores were statistically significant ($p < .05$). No other differences were found.

Table 15

Means for Preventive Medicine Practice Scores by Race/Ethnicity

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval	
						Lower Bound	Upper Bound
Overall Prevention Behavior Score	Asian	10	92.10	33.211	10.502	68.34	115.86
	Black/African American	28	102.25	34.917	6.599	88.71	115.79
	Hispanic/Latino	14	126.93	37.064	9.906	105.53	148.33
	White/Caucasian	210	98.32	33.790	2.332	93.73	102.92
	Other[a]	12	107.25	39.795	11.488	81.97	132.53
	Total	274	100.35	34.708	2.097	96.22	104.48
Harmful Activities Score	Asian	10	15.50	7.934	2.509	9.82	21.18
	Black/African American	27	17.44	5.132	.988	15.41	19.47
	Hispanic/Latino	14	20.43	5.667	1.514	17.16	23.70
	White/Caucasian	209	16.06	5.403	.374	15.32	16.79
	Other[a]	12	18.33	4.292	1.239	15.61	21.06
	Total	272	16.50	5.526	.335	15.84	17.16

[a] Other: American Indian or Alaska Native; Native Hawaiian or Other Pacific Islander; Multi-racial/Multi-ethnic

Table 16

ANOVA for Preventive Medicine Practice Scores by Race/Ethnicity

		Sum of Squares	df	Mean Square	*F*	Sig.
Behavior Score	Between Groups	20440.60	4	5110.15	2.209	.068
	Within Groups	622162.96	269	2312.87		
	Total	642603.56	273			
Overall Prevention Behavior Score	Between Groups	12105.06	4	3026.26	2.570	.038[a]
	Within Groups	316757.31	269	1177.54		
	Total	328862.36	273			
Primary Prevention Score	Between Groups	4108.29	4	1027.07	2.149	.075
	Within Groups	128565.81	269	477.94		
	Total	132674.10	273			
CVD Prevention Score	Between Groups	1978.69	4	494.67	1.463	.214
	Within Groups	90963.08	269	338.15		
	Total	92941.77	273			
Harmful Activities Score	Between Groups	331.43	4	82.86	2.785	.027[a]
	Within Groups	7942.57	267	29.75		
	Total	8274.00	271			
Substance Use Score	Between Groups	167.33	4	41.83	2.054	.087
	Within Groups	5436.65	267	20.36		
	Total	5603.99	271			
Cancer Screening Score	Between Groups	257.28	4	64.32	1.671	.157
	Within Groups	10274.54	267	38.48		
	Total	10531.82	271			
Smoking Cessation Score	Between Groups	222.78	4	55.69	.557	.694
	Within Groups	26406.31	264	100.02		
	Total	26629.09	268			
Hypertension Management Score	Between Groups	429.09	4	107.27	1.849	.120
	Within Groups	15432.61	266	58.02		
	Total	15861.70	270			

[a] The mean difference is significant at the 0.05 level.

Age. The results of the ANOVA revealed no statistically significant difference (p >.05) in preventive medicine practice scores by age (see Table 17).

Table 17

ANOVA for Preventive Medicine Practice Scores by Age

		Sum of Squares	df	Mean Square	*F*	Sig.
Behavior Score	Between Groups	1798.19	3	599.40	.253	.859
	Within Groups	640934.37	271	2365.07		
	Total	642732.57	274			
Overall Prevention Behavior Score	Between Groups	2550.88	3	850.29	.707	.548
	Within Groups	325699.55	271	1201.84		
	Total	328250.42	274			
Primary Prevention Score	Between Groups	954.24	3	318.08	.655	.580
	Within Groups	131544.91	271	485.41		
	Total	132499.14	274			
CVD Prevention Score	Between Groups	234.12	3	78.04	.228	.877
	Within Groups	92638.99	271	341.84		
	Total	92873.11	274			
Harmful Activities Score	Between Groups	137.16	3	45.72	1.510	.212
	Within Groups	8146.98	269	30.29		
	Total	8284.14	272			
Substance Use Score	Between Groups	87.26	3	29.09	1.414	.239
	Within Groups	5532.66	269	20.57		
	Total	5619.92	272			
Cancer Screening Score	Between Groups	57.00	3	19.00	.484	.694
	Within Groups	10562.13	269	39.26		
	Total	10619.13	272			
Smoking Cessation Score	Between Groups	719.05	3	239.68	2.461	.063
	Within Groups	25908.31	266	97.40		
	Total	26627.37	269			
Hypertension Management Score	Between Groups	128.70	3	42.90	.727	.536
	Within Groups	15807.53	268	58.98		
	Total	15936.24	271			

Years licensed. As shown in Table 18, the results of the ANOVA revealed no statistically significant difference ($p > .05$) in preventive medicine practice scores by years licensed.

Table 18

ANOVA for Preventive Medicine Practice Scores by Years Licensed

		Sum of Squares	df	Mean Square	*F*	Sig.
Behavior Score	Between Groups	453.49	3	151.16	.064	.979
	Within Groups	642893.70	271	2372.30		
	Total	643347.19	274			
Overall Prevention Behavior Score	Between Groups	748.38	3	249.46	.206	.892
	Within Groups	328212.53	271	1211.12		
	Total	328960.91	274			
Primary Prevention Score	Between Groups	366.52	3	122.17	.250	.861
	Within Groups	132213.25	271	487.87		
	Total	132579.77	274			
CVD Prevention Score	Between Groups	112.33	3	37.44	.109	.955
	Within Groups	92690.05	271	342.03		
	Total	92802.39	274			
Harmful Activities Score	Between Groups	71.23	3	23.74	.778	.507
	Within Groups	8208.86	269	30.52		
	Total	8280.10	272			
Substance Use Score	Between Groups	107.85	3	35.95	1.759	.155
	Within Groups	5499.15	269	20.44		
	Total	5607.00	272			
Cancer Screening Score	Between Groups	2.49	3	.83	.021	.996
	Within Groups	10667.56	269	39.66		
	Total	10670.04	272			
Smoking Cessation Score	Between Groups	68.73	3	22.91	.229	.876
	Within Groups	26580.47	266	99.93		
	Total	26649.20	269			
Hypertension Management Score	Between Groups	14.12	3	4.71	.079	.971
	Within Groups	15922.11	268	59.41		
	Total	15936.24	271			

Primary clinical specialty. As shown in Table 20, the results of the ANOVA revealed statistically significant differences ($p < .01$) in preventive medicine practice scores by primary clinical specialty. Physician assistants who worked in primary care scored higher on the behavior ($M = 173.46$), overall prevention behavior ($M = 123.10$), primary prevention ($M = 81.62$), CVD prevention ($M = 55.96$), cancer screening ($M = 15.52$), smoking cessation ($M = 27.42$), and hypertension management ($M = 23.45$) as compared to physician assistants in other specialties. Additionally, emergency medicine physician assistants scored higher on the harmful activities ($M = 20.15$) and substance use ($M = 18.90$) as compared to physician assistants in other specialties (see Table 19).

Post-hoc analysis using Tukey HSD found statistically significant ($p < .05$) differences between primary care and internal medicine subspecialties, emergency medicine, surgical subspecialties, and other subspecialties for all scores except substance use; internal medicine subspecialties and surgical subspecialties for all scores except CVD prevention, harmful activities, and substance use; emergency medicine and internal medicine subspecialties for harmful activities score; emergency medicine and surgical subspecialties for substance use and hypertension management scores, and emergency medicine and other subspecialties for substance use score.

Table 19

Means for Preventive Medicine Practice Scores by Primary Clinical Specialty

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval	
						Lower Bound	Upper Bound
Behavior Score	Primary Care	107	173.46	37.206	3.597	166.33	180.59
	Internal Medicine Subspecialties	36	139.92	46.904	7.817	124.05	155.79
	Emergency Medicine	20	129.65	27.645	6.182	116.71	142.59
	Surgical Subspecialties	66	112.91	44.731	5.506	101.91	123.91
	Other Subspecialties	46	125.02	46.491	6.855	111.22	138.83
	Total	275	143.25	48.456	2.922	137.49	149.00
Overall Prevention Behavior Score	Primary Care	107	123.10	27.187	2.628	117.89	128.31
	Internal Medicine Subspecialties	36	96.22	31.095	5.183	85.70	106.74
	Emergency Medicine	20	89.10	19.700	4.405	79.88	98.32
	Surgical Subspecialties	66	77.24	30.717	3.781	69.69	84.79
	Other Subspecialties	46	88.89	32.745	4.828	79.17	98.62
	Total	275	100.38	34.649	2.089	96.27	104.50
Primary Prevention Score	Primary Care	107	81.62	16.781	1.622	78.40	84.83
	Internal Medicine Subspecialties	36	67.83	19.468	3.245	61.25	74.42
	Emergency Medicine	20	63.50	13.133	2.937	57.35	69.65
	Surgical Subspecialties	66	55.03	21.354	2.629	49.78	60.28
	Other Subspecialties	46	64.26	23.551	3.472	57.27	71.25
	Total	275	69.21	21.997	1.326	66.60	71.82
CVD Prevention Score	Primary Care	107	55.96	13.869	1.341	53.30	58.62
	Internal Medicine Subspecialties	36	45.19	19.530	3.255	38.59	51.80
	Emergency Medicine	20	33.20	12.992	2.905	27.12	39.28
	Surgical Subspecialties	66	37.62	18.617	2.292	33.04	42.20
	Other Subspecialties	46	44.59	18.121	2.672	39.21	49.97
	Total	275	46.59	18.404	1.110	44.41	48.78

(table continues)

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Harmful Activities Score	Primary Care	107	18.79	4.916	.475	17.85	19.74
	Internal Medicine Subspecialties	36	15.83	4.011	.668	14.48	17.19
	Emergency Medicine	20	20.15	3.543	.792	18.49	21.81
	Surgical Subspecialties	65	13.46	4.848	.601	12.26	14.66
	Other Subspecialties	45	14.49	6.370	.950	12.58	16.40
	Total	273	16.52	5.517	.334	15.87	17.18
Substance Use Score		107	16.39	3.652	.353	15.69	17.09
	Primary Care						
	Internal Medicine Subspecialties	36	17.25	3.636	.606	16.02	18.48
	Emergency Medicine	20	18.90	2.174	.486	17.88	19.92
	Surgical Subspecialties	65	15.74	5.023	.623	14.49	16.98
	Other Subspecialties	45	14.58	6.225	.928	12.71	16.45
	Total	273	16.23	4.540	.275	15.69	16.78
Cancer Screening Score		107	15.52	4.701	.454	14.62	16.42
	Primary Care						
	Internal Medicine Subspecialties	36	9.81	5.507	.918	7.94	11.67
	Emergency Medicine	20	8.10	2.732	.611	6.82	9.38
	Surgical Subspecialties	65	5.94	4.510	.559	4.82	7.06
	Other Subspecialties	45	6.93	4.919	.733	5.46	8.41
	Total	273	10.53	6.263	.379	9.78	11.27
Smoking Cessation Score		105	27.42	9.021	.880	25.67	29.16
	Primary Care						
	Internal Medicine Subspecialties	34	26.71	10.861	1.863	22.92	30.50
	Emergency Medicine	20	20.40	6.816	1.524	17.21	23.59
	Surgical Subspecialties	66	20.97	9.369	1.153	18.67	23.27
	Other Subspecialties	45	20.82	10.566	1.575	17.65	24.00
	Total	270	24.13	9.953	.606	22.94	25.33
Hypertension Management Score		107	23.45	5.004	.484	22.49	24.41
	Primary Care						
	Internal Medicine Subspecialties	34	19.56	7.832	1.343	16.83	22.29
	Emergency Medicine	20	20.15	5.184	1.159	17.72	22.58
	Surgical Subspecialties	66	14.70	7.940	.977	12.75	16.65
	Other Subspecialties	45	16.11	8.169	1.218	13.66	18.57
	Total	272	19.38	7.668	.465	18.47	20.30

Table 20

ANOVA for Preventive Medicine Practice Scores by Primary Clinical Specialty

		Sum of Squares	df	Mean Square	*F*	Sig.
Behavior Score	Between Groups	177780.89	4	44445.22	25.776	.000
	Within Groups	465566.29	270	1724.32		
	Total	643347.19	274			
Overall Prevention Behavior Score	Between Groups	99818.44	4	24954.61	29.404	.000
	Within Groups	229142.47	270	848.68		
	Total	328960.91	274			
Primary Prevention Score	Between Groups	31587.67	4	7896.92	21.112	.000
	Within Groups	100992.10	270	374.04		
	Total	132579.77	274			
CVD Prevention Score	Between Groups	18549.01	4	4637.25	16.862	.000
	Within Groups	74253.37	270	275.01		
	Total	92802.39	274			
Harmful Activities Score	Between Groups	1627.67	4	406.92	16.393	.000
	Within Groups	6652.42	268	24.82		
	Total	8280.10	272			
Substance Use Score	Between Groups	321.40	4	80.35	4.074	.003
	Within Groups	5285.60	268	19.72		
	Total	5607.00	272			
Cancer Screening Score	Between Groups	4757.36	4	1189.34	53.908	.000
	Within Groups	5912.68	268	22.06		
	Total	10670.04	272			
Smoking Cessation Score	Between Groups	2791.26	4	697.82	7.751	.000
	Within Groups	23857.94	265	90.03		
	Total	26649.20	269			
Hypertension Management Score	Between Groups	3712.45	4	928.11	20.272	.000
	Within Groups	12223.78	267	45.78		
	Total	15936.24	271			

Note. The mean difference is significant at the 0.05 level.

Practice region. The results of the ANOVA in Table 22 revealed no statistically significant difference ($p > .05$) in preventive medicine practice scores by practice region, except for substance use score, $F(4, 269) = 2.449$, $p = .047$. Physician assistants who practiced in the northeast scored highest ($M = 17.02$) and those who practiced in the west scored lowest ($M = 14.83$; see Table 21). Although there was a difference between practice region groups related to substance use scores, post-hoc analysis, Tukey HSD, revealed the mean differences were not statistically significant ($p > .05$).

Table 21

Means for Preventive Medicine Practice Scores by Practice Region

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval	
						Lower Bound	Upper Bound
Substance Use Score	Northeast	93	17.02	4.067	.422	16.18	17.86
	Midwest	42	15.26	5.199	.802	13.64	16.88
	South	87	16.52	3.917	.420	15.68	17.35
	West	46	14.83	5.384	.794	13.23	16.43
	Other/U.S. Territory	6	16.83	5.879	2.400	10.66	23.00
	Total	274	16.22	4.539	.274	15.68	16.76

Table 22

ANOVA for Preventive Medicine Practice Scores by Practice Region

		Sum of Squares	df	Mean Square	*F*	Sig.
Behavior Score	Between Groups	5769.19	4	1442.30	.613	.654
	Within Groups	637825.25	271	2353.60		
	Total	643594.43	275			
Overall Prevention Behavior Score	Between Groups	3543.54	4	885.89	.737	.567
	Within Groups	325576.01	271	1201.39		
	Total	329119.55	275			
Primary Prevention Score	Between Groups	1489.74	4	372.43	.769	.546
	Within Groups	131185.51	271	484.08		
	Total	132675.25	275			
CVD Prevention Score	Between Groups	457.70	4	114.43	.335	.854
	Within Groups	92551.50	271	341.52		
	Total	93009.20	275			
Harmful Activities Score	Between Groups	98.30	4	24.57	.807	.521
	Within Groups	8188.15	269	30.44		
	Total	8286.44	273			
Substance Use Score	Between Groups	197.62	4	49.40	2.449	.047[a]
	Within Groups	5427.24	269	20.18		
	Total	5624.86	273			
Cancer Screening Score	Between Groups	133.62	4	33.41	.852	.493
	Within Groups	10542.51	269	39.19		
	Total	10676.14	273			
Smoking Cessation Score	Between Groups	249.79	4	62.45	.629	.642
	Within Groups	26403.94	266	99.26		
	Total	26653.73	270			
Hypertension Management Score	Between Groups	119.69	4	29.92	.506	.731
	Within Groups	15837.79	268	59.10		
	Total	15957.48	272			

[a] The mean difference is not significant at the 0.05 level.

Practice environment. As shown in Table 24, the results of the ANOVA revealed statistically significant differences ($p < .01$) in preventive medicine practice scores by practice environment. For all but one score, substance use, physician assistants working in community health centers scored the highest; physician assistants working in hospital settings scored highest on substance use ($M = 17.17$). However, they scored the lowest on behavior score ($M = 126.47$), overall prevention behavior score ($M = 86.29$), primary prevention ($M = 61.43$), CVD prevention score ($M = 38.78$), cancer screening score ($M = 7.30$), and hypertension management score ($M = 17.89$; see Table 23).

Post-hoc analysis using Tukey HSD found statistically significant ($p < .05$) differences between hospital and community health centers for all scores except substance use; hospital and physician group/solo practice and hospital and certified rural health clinics for all scores except harmful activities, substance use, smoking cessation, and hypertension management; physician group/solo practice and community health centers for behavior, overall prevention behavior, harmful activities, and cancer screening scores; community health center and other for behavior, overall prevention behavior, harmful activities, cancer screening, and smoking cessation scores; hospital and other for substance use score; physician group/solo practice and certified rural health center for cancer screening score; and certified rural health center and other for cancer screening score.

Table 23

Means for Preventive Medicine Practice Scores by Practice Environment

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval	
						Lower Bound	Upper Bound
Behavior Score	Hospital	107	126.47	43.044	4.161	118.22	134.72
	Physician Group or Solo Practice	112	148.17	49.453	4.673	138.91	157.43
	Community Health Center	32	179.44	32.330	5.715	167.78	191.09
	Certified Rural Health Clinic	12	173.67	36.689	10.591	150.36	196.98
	Other	16	131.31	55.175	13.794	101.91	160.71
	Total	279	143.56	48.311	2.892	137.87	149.26
Overall Prevention Behavior Score	Hospital	107	86.29	28.824	2.787	80.77	91.81
	Physician Group or Solo Practice	112	105.44	34.783	3.287	98.92	111.95
	Community Health Center	32	126.91	24.701	4.367	118.00	135.81
	Certified Rural Health Clinic	12	123.00	26.840	7.748	105.95	140.05
	Other	16	96.19	41.336	10.334	74.16	118.21
	Total	279	100.78	34.340	2.056	96.73	104.83
Primary Prevention Score	Hospital	107	61.43	19.932	1.927	57.61	65.25
	Physician Group or Solo Practice	112	72.48	21.483	2.030	68.46	76.50
	Community Health Center	32	83.53	15.596	2.757	77.91	89.15
	Certified Rural Health Clinic	12	80.25	17.195	4.964	69.32	91.18
	Other	16	66.31	26.973	6.743	51.94	80.69
	Total	279	69.49	21.696	1.299	66.93	72.05
CVD Prevention Score	Hospital	107	38.78	17.852	1.726	35.35	42.20
	Physician Group or Solo Practice	112	50.38	17.298	1.635	47.14	53.61
	Community Health Center	32	56.22	11.239	1.987	52.17	60.27
	Certified Rural Health Clinic	12	56.17	14.364	4.147	47.04	65.29
	Other	16	47.06	24.288	6.072	34.12	60.00
	Total	279	46.66	18.411	1.102	44.49	48.83
Harmful Activities Score	Hospital	107	16.12	4.954	.479	15.17	17.07
	Physician Group or Solo Practice	112	16.06	5.799	.548	14.98	17.15
	Community Health Center	32	20.00	4.977	.880	18.21	21.79
	Certified Rural Health Clinic	12	18.25	4.789	1.382	15.21	21.29
	Other	16	13.75	6.083	1.521	10.51	16.99
	Total	279	16.50	5.528	.331	15.85	17.15

(table continues)

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval	
						Lower Bound	Upper Bound
Substance Use Score	Hospital	107	17.17	4.437	.429	16.32	18.02
	Physician Group or Solo Practice	112	15.59	4.431	.419	14.76	16.42
	Community Health Center	32	16.91	3.684	.651	15.58	18.23
	Certified Rural Health Clinic	12	15.42	3.579	1.033	13.14	17.69
	Other	16	13.31	6.447	1.612	9.88	16.75
	Total	279	16.21	4.548	.272	15.67	16.74
Cancer Screening Score	Hospital	107	7.30	4.254	.411	6.48	8.11
	Physician Group or Solo Practice	112	11.54	6.784	.641	10.27	12.81
	Community Health Center	32	16.47	3.877	.685	15.07	17.87
	Certified Rural Health Clinic	12	16.17	3.762	1.086	13.78	18.56
	Other	16	9.06	5.471	1.368	6.15	11.98
	Total	279	10.54	6.254	.374	9.80	11.27
Smoking Cessation Score	Hospital	106	22.67	9.847	.956	20.77	24.57
	Physician Group or Solo Practice	110	24.20	9.505	.906	22.40	26.00
	Community Health Center	32	29.19	8.337	1.474	26.18	32.19
	Certified Rural Health Clinic	12	27.42	8.847	2.554	21.80	33.04
	Other	14	17.57	10.286	2.749	11.63	23.51
	Total	274	23.99	9.795	.592	22.83	25.16
Hypertension Management Score	Hospital	106	17.89	7.439	.723	16.45	19.32
	Physician Group or Solo Practice	110	19.31	8.323	.794	17.74	20.88
	Community Health Center	32	23.34	4.411	.780	21.75	24.93
	Certified Rural Health Clinic	12	23.25	4.309	1.244	20.51	25.99
	Other	16	19.75	8.071	2.018	15.45	24.05
	Total	276	19.43	7.644	.460	18.52	20.33

Table 24

ANOVA for Preventive Medicine Practice Scores by Practice Environment

		Sum of Squares	df	Mean Square	*F*	Sig.
Behavior Score	Between Groups	88108.26	4	22027.07	10.763	.000
	Within Groups	560732.39	274	2046.47		
	Total	648840.65	278			
Overall Prevention Behavior Score	Between Groups	53000.93	4	13250.23	13.210	.000
	Within Groups	274832.74	274	1003.04		
	Total	327833.66	278			
Primary Prevention Score	Between Groups	15813.88	4	3953.47	9.416	.000
	Within Groups	115045.84	274	419.88		
	Total	130859.73	278			
CVD Prevention Score	Between Groups	12208.03	4	3052.01	10.195	.000
	Within Groups	82028.94	274	299.38		
	Total	94236.97	278			
Harmful Activities Score	Between Groups	586.52	4	146.63	5.080	.001
	Within Groups	7909.23	274	28.87		
	Total	8495.75	278			
Substance Use Score	Between Groups	298.79	4	74.70	3.755	.005
	Within Groups	5451.15	274	19.89		
	Total	5749.94	278			
Cancer Screening Score	Between Groups	2776.58	4	694.14	23.490	.000
	Within Groups	8096.78	274	29.55		
	Total	10873.35	278			
Smoking Cessation Score	Between Groups	1771.72	4	442.93	4.879	.001
	Within Groups	24420.26	269	90.78		
	Total	26191.99	273			
Hypertension Management Score	Between Groups	920.95	4	230.24	4.119	.003
	Within Groups	15146.60	271	55.89		
	Total	16067.55	275			

Note. The mean difference is significant at the 0.05 level.

Hours worked. As shown in Table 25, the ANOVA revealed no statistically significant difference ($p > .05$) in preventive medicine practice scores by hours worked.

Table 25

ANOVA for Preventive Medicine Practice Scores by Hours Worked

		Sum of Squares	df	Mean Square	*F*	Sig.
Behavior Score	Between Groups	10750.86	3	3583.62	1.544	.203
	Within Groups	638089.79	275	2320.33		
	Total	648840.65	278			
Overall Prevention Behavior Score	Between Groups	6868.28	3	2289.43	1.962	.120
	Within Groups	320965.39	275	1167.15		
	Total	327833.66	278			
Primary Prevention Score	Between Groups	3419.66	3	1139.89	2.460	.063
	Within Groups	127440.07	275	463.42		
	Total	130859.73	278			
CVD Prevention Score	Between Groups	1726.71	3	575.57	1.711	.165
	Within Groups	92510.26	275	336.40		
	Total	94236.97	278			
Harmful Activities Score	Between Groups	205.89	3	68.63	2.277	.080
	Within Groups	8289.86	275	30.14		
	Total	8495.75	278			
Substance Use Score	Between Groups	118.18	3	39.39	1.924	.126
	Within Groups	5631.76	275	20.48		
	Total	5749.94	278			
Cancer Screening Score	Between Groups	191.45	3	63.82	1.643	.180
	Within Groups	10681.90	275	38.84		
	Total	10873.35	278			
Smoking Cessation Score	Between Groups	222.86	3	74.29	.772	.510
	Within Groups	25969.12	270	96.18		
	Total	26191.99	273			
Hypertension Management Score	Between Groups	339.87	3	113.29	1.959	.120
	Within Groups	15727.68	272	57.82		
	Total	16067.55	275			

Number of patients seen. The results of the ANOVA in Table 27 revealed no statistically significant difference ($p > .05$) in preventive medicine practice scores by number of patients seen, except on hypertension management score, $F(3, 270) = 3.239$, $p = .023$. The mean increased with the number of patients seen: less than 10 ($M = 16.54$), 10–20 ($M = 18.89$), 21–30 ($M = 20.88$), and more than 30 ($M = 21.92$; see Table 26). Though there was a difference between groups, the mean differences were not statistically significant as indicated by post-hoc analysis, Tukey HSD. Additionally, there was a near statistical significance for behavior score. The mean (Table 26) increased with the number of patients seen: less than 10 ($M = 129.08$), 10–20 ($M = 140.89$), 21–30 ($M = 148.20$), and more than 30 ($M = 163.68$); however, the results were not statistically significant, but did approach significance, $F(3, 271) = 2.620$, $p = .051$.

Table 26

Means for Preventive Medicine Practice Scores by Number of Patients Seen

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
Behavior Score	Less than 10	26	129.08	42.063	8.249	112.09	146.07
	10–20	160	140.89	49.834	3.940	133.11	148.67
	21–30	66	148.20	42.726	5.259	137.69	158.70
	More than 30	25	163.68	54.763	10.953	141.07	186.29
	Total	277	143.58	48.449	2.911	137.85	149.31
Hypertension Management Score	Less than 10	26	16.54	7.506	1.472	13.51	19.57
	10–20	157	18.89	8.049	.642	17.62	20.16
	21–30	66	20.88	5.927	.730	19.42	22.34
	More than 30	25	21.92	8.321	1.664	18.49	25.35
	Total	274	19.42	7.660	.463	18.51	20.33

Table 27

ANOVA for Preventive Medicine Practice Scores by Number of Patients Seen

		Sum of Squares	df	Mean Square	*F*	Sig.
Behavior Score	Between Groups	18130.50	3	6043.50	2.620	.051
	Within Groups	629728.92	273	2306.70		
	Total	647859.42	276			
Overall Prevention Behavior Score	Between Groups	8236.99	3	2745.66	2.346	.073
	Within Groups	319451.13	273	1170.15		
	Total	327688.12	276			
Primary Prevention Score	Between Groups	2588.50	3	862.83	1.837	.141
	Within Groups	128208.55	273	469.63		
	Total	130797.05	276			
CVD Prevention Score	Between Groups	2297.49	3	765.83	2.275	.080
	Within Groups	91918.69	273	336.70		
	Total	94216.17	276			
Harmful Activities Score	Between Groups	56.58	3	18.86	.611	.609
	Within Groups	8432.64	273	30.89		
	Total	8489.23	276			
Substance Use Score	Between Groups	10.67	3	3.56	.170	.917
	Within Groups	5711.41	273	20.92		
	Total	5722.08	276			
Cancer Screening Score	Between Groups	139.34	3	46.45	1.182	.317
	Within Groups	10725.59	273	39.29		
	Total	10864.92	276			
Smoking Cessation Score	Between Groups	516.50	3	172.17	1.810	.146
	Within Groups	25490.32	268	95.11		
	Total	26006.82	271			
Hypertension Management Score	Between Groups	556.40	3	185.47	3.239	.023[a]
	Within Groups	15460.49	270	57.26		
	Total	16016.89	273			

[a] The mean difference is not significant at the 0.05 level.

Prevention and Counseling Attitudes

Prevention and counseling attitudes were assessed with the attitude scale of the PMAAQ. The scale contains 36 items across four scales—behavior change effectiveness, importance of prevention counseling, lifestyle counseling effectiveness, and comfort discussing sensitive topics—and three subscales—CVD behavior change effectiveness, importance of CVD prevention counseling, and smoking cessation counseling—rated on a 5- and 4-point Likert scale, with three different ranges: *very effective to do not counsel* (5-point)*; very important to not very important* (4-point), and *strongly agree to strongly disagree* (5-point). Items with a negatively phrased stem were reversed coded so that all scales were scored in the same direction. Lower numbers indicate greater importance, effectiveness, and comfort.

Behavior change effectiveness. Twelve items evaluated behavior change effectiveness. Physician assistants felt they were somewhat effective (M_{range} = 3.05 – 3.89) on all but one preventive medicine practice, seat belt use (M = 4.06), where it appears they believed they were minimally effective. Table 28 shows the mean score for each scale item.

Importance of prevention counseling. Fifteen items assessed the importance of prevention counseling. Results indicate that physician assistants believed it was very important to counsel patients on health promotion and disease prevention topics. Of highest importance: smoking (M = 1.14), exercise (M = 1.23), blood pressure (M = 1.24), healthy diet (M = 1.24), and weight reduction (M = 1.26). Although very important, injury reduction (M = 1.67) and seatbelt use (M = 1.77) were the lowest. See Table 28 for the mean score for each item.

Comfort discussing sensitive topics. Table 28 shows the four items used to assess comfort discussing sensitive topics. On average, physician assistants were comfortable discussing illegal drug use (*M* = 1.54), sexual behavior (*M* = 1.72), and asking patients about their sexual orientation (*M* = 1.89), and somewhat comfortable counseling patients about HIV/AIDS (*M* = 2.01).

Lifestyle counseling effectiveness. Table 28 reveals five items used in the evaluation of lifestyle counseling effectiveness. Results imply that physician assistants strongly believed that smoking cessation was an effective use of their time (*M* = 1.73) and somewhat believed that patients try to change their lifestyles based on their advice (*M* = 2.68). They were neutral regarding their beliefs about health education promoting patients' adherence to a healthy lifestyle (*M* = 3.00), being less effective than professional counselors in getting patients to quit smoking (*M* = 3.09), and the notion that patients without symptoms rarely change their behavior on the basis of their advice (*M* = 3.25).

Table 28

Means for PMAAQ Attitude Scale Items

	N	*M*	*SD*
Behavior Change Effectiveness	**270**	**41.06**	**9.83**
Alcohol Consumption	268	3.34	.959
Safe Sex Practices	267	3.54	1.20
Illegal Drug Use	267	3.44	1.05
Exercise	268	3.06	1.07
Healthy Diet	266	3.09	1.09
Smoking Cessation	269	3.05	1.08
Weight Reduction	268	3.26	1.01
Seatbelt Use	268	4.06	1.26
Stress Management	269	3.35	1.08
Injury Prevention	270	3.54	1.21
Violence Prevention	269	3.89	1.15
UV Exposure	269	3.71	1.21
Importance of Prevention Counseling	**272**	**20.84**	**8.80**
Alcohol Consumption	272	1.34	0.66
Safe Sex Practices	271	1.36	0.74
Illegal Drug Use	271	1.30	0.66
Cholesterol	272	1.30	0.63
Blood Pressure	272	1.24	0.60
Exercise	272	1.23	0.60
Healthy Diet	272	1.24	0.60
Smoking	272	1.14	0.52
Weight Reduction	272	1.26	0.62
Seatbelt Use	271	1.77	0.99
Stress/Relaxation	271	1.52	0.76
Injury Prevention	271	1.67	0.87
Violence Prevention	272	1.59	0.85
UV Exposure	272	1.53	0.81
Depression Management	272	1.40	0.72
Comfort Discussing Sensitive Topics	**275**	**13.73**	**3.51**
I feel comfortable discussing illegal drug use with patients.	275	1.54	0.82
I feel comfortable discussing sexual behavior with patients.	275	1.72	0.97
I feel comfortable asking patients about their sexual orientation.	274	1.89	1.05
I feel comfortable counseling patients about HIV/AIDS.	274	2.01	1.15
Lifestyle Counseling Effectiveness	**275**	**7.15**	**3.37**
Smoking cessation counseling is an effective use of my time.	275	1.73	0.99
Health education does little to promote adherence to a healthy lifestyle.	274	3.00	1.33
I am less effective than professional counselors in getting patients to quit smoking.	274	3.09	1.18
Patients w/o symptoms will rarely change their behavior on the basis of my advice.	275	3.25	1.13
Most patients try to change their lifestyles if I advise them to do so.	275	2.68	0.95

Overall prevention and counseling attitudes. Physician assistants believed they were somewhat effective at changing overall (*M* = 41.06) and CVD behaviors (*M* = 12.41); moderately effective at smoking cessation counseling (*M* = 7.77), and moderately comfortable discussing sensitive topics (*M* = 7.15). They believed it is very important for them to counsel patients on health promotion and disease prevention (*M* = 20.84) and CVD-related issues (*M* = 7.39), but felt they were somewhat less effective at lifestyle counseling (*M* = 13.73; see Table 29).

Table 29

Means of Attitude Scale and Subscale Summary Scores

	N	Min	Max	*Mean*	*SD*
Attitude Scale	**276**	**19**	**147**	**81.51**	**19.17**
Behavior Change Effectiveness	270	3	60	41.06	9.83
CVD Behavior Change Effectiveness	269	4	20	12.41	3.76
Importance of Prevention Counseling	272	14	60	20.84	8.80
Importance of Counseling for CVD	272	6	24	7.39	3.33
Lifestyle Counseling Effectiveness	275	5	24	13.73	3.51
Smoking Cessation Counseling	276	2	15	7.77	2.41
Comfort Discussing Sensitive Topics	275	4	20	7.15	3.37

Difference between the means. Independent-samples *t* test and ANOVA were conducted to determine if differences between the means of physician assistants' personal and professional characteristics on prevention and counseling attitudes existed. Mean tables are only reported if a statistically significant difference was found.

Gender. The independent-samples *t* test for gender revealed a statistically significant difference ($p < .05$) between men and women for lifestyle counseling effectiveness score and smoking cessation score. Men scored higher ($M = 14.64$) than women ($M = 13.29$) on lifestyle counseling effectiveness, $t(268) = 2.970$, $p < .01$; they also scored higher ($M = 8.34$) than women ($M = 7.51$) on smoking cessation, $t(138.39) = 2.425$, $p = .017$ (see Table 30 and Table 31). These results indicate men were less effective at lifestyle counseling and smoking cessation counseling than women. There were no significant differences between men and women on attitude score, behavior change effectiveness score, CVD behavior change effectiveness score, importance of prevention counseling score, importance of CVD prevention counseling score, or comfort discussing sensitive topics score.

Table 30

Means for Prevention and Counseling Attitude Scores by Gender

	Gender	*N*	Mean	Std. Deviation	Std. Error Mean
Lifestyle Counseling Effectiveness Score	Male	86	14.64	3.665	.395
	Female	184	13.29	3.395	.250
Smoking Cessation Counseling Score	Male	86	8.34	2.759	.298
	Female	185	7.51	2.227	.164

Table 31

Independent-Samples t test for Statistically Significant Prevention and Counseling Attitude Scores by Gender

		Levene's Test for Equality of Variances		*t* test for Equality of Means						
		F	Sig.	*t*	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval	
									Lower	Upper
Attitude Score	Equal variances not assumed	4.504	.035	1.938	136.753	.055	5.240	2.704	-.107	10.587
Behavior Change Effectiveness Score	Equal variances assumed	1.105	.294	1.497	263	.136	1.938	1.295	-.611	4.487
CVD Behavior Change Effectiveness Score	Equal variances assumed	3.452	.064	1.876	262	.062	.925	.493	-.046	1.895
Importance of Prevention Counseling Score	Equal variances assumed	2.490	.116	1.669	265	.096	1.943	1.164	-.349	4.234
Importance of CVD Prevention Counseling Score	Equal variances assumed	2.843	.093	1.325	265	.186	.584	.440	-.284	1.451
Lifestyle Counseling Effectiveness Score	Equal variances assumed	.303	.583	2.970	268	.003	1.351	.455	.456	2.247
Smoking Cessation Counseling Score	Equal variances not assumed	7.892	.005	2.425	138.385	.017	.824	.340	.152	1.495
Comfort Discussing Sensitive Topics Score	Equal variances not assumed	3.904	.049	.662	140.292	.509	.306	.462	-.608	1.220

Note. 'Equal variances not assumed' indicates the assumption of homogeneity was violated. Therefore Welch *t*-test results are used.

Race/ethnicity. The ANOVA for race/ethnicity revealed a statistically significant difference in attitude score, $F(4, 264) = 3.001$, $p = .019$; behavior change effectiveness score, $F(4, 259) = 5.597$, $p < .001$, and CVD behavior change effectiveness score, $F(4, 258) = 3.190$, $p = .014$ (see Table 33). Table 32 shows that for all three scores, physician assistants identifying as White/Caucasian scored the highest ($M = 83.37$, $M = 42.25$, and $M = 12.81$, respectively), indicating they believe they are less effective at changing patient behaviors. Physician assistants identifying as Hispanic/Latino scored the lowest ($M = 67.79$) on attitude and behavior change effectiveness ($M = 30.38$), and physician assistants identifying as Asian scored the lowest ($M = 10.10$) for CVD behavior change effectiveness. Although there was a difference between race/ethnicity groups related to CVD behavior change effectiveness scores, post-hoc analysis, Tukey HSD, revealed the mean differences were not statistically significant ($p > .05$). Post-hoc analysis, did find however, mean differences between physician assistants identifying as Hispanic/Latino and those identifying as White/Caucasian for attitude score ($p = .022$) and behavior change effectiveness score ($p < .001$). No other differences were found.

Table 32

Means for Prevention and Counseling Attitude Scores by Race/Ethnicity

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Attitude Score	Asian	10	74.70	18.252	5.772	61.64	87.76
	Black/African American	28	78.00	17.393	3.287	71.26	84.74
	Hispanic/Latino	14	67.79	15.832	4.231	58.64	76.93
	White/Caucasian	205	83.37	18.902	1.320	80.76	85.97
	Other	12	82.08	19.090	5.511	69.95	94.21
	Total	269	81.62	18.874	1.151	79.35	83.88
Behavior Change Effectiveness Score	Asian	10	39.20	10.218	3.231	31.89	46.51
	Black/African American	28	38.36	10.629	2.009	34.24	42.48
	Hispanic/Latino	13	30.38	10.397	2.884	24.10	36.67
	White/Caucasian	201	42.25	9.205	.649	40.97	43.53
	Other	12	39.75	10.532	3.040	33.06	46.44
	Total	264	41.03	9.843	.606	39.83	42.22
CVD Behavior Change Effectiveness Score	Asian	10	10.10	4.886	1.545	6.60	13.60
	Black/African American	28	11.68	3.926	.742	10.16	13.20
	Hispanic/Latino	13	10.15	3.805	1.055	7.85	12.45
	White/Caucasian	200	12.81	3.537	.250	12.31	13.30
	Other	12	11.58	4.481	1.294	8.74	14.43
	Total	263	12.40	3.752	.231	11.94	12.85

[a] Other: American Indian or Alaska Native; Native Hawaiian or Other Pacific Islander; Multi-racial/Multi-ethnic

Table 33

ANOVA for Prevention and Counseling Attitude Scores by Race/Ethnicity

		Sum of Squares	df	Mean Square	*F*	Sig.
Attitude Score	Between Groups	4152.627	4	1038.157	3.001	.019
	Within Groups	91320.935	264	345.913		
	Total	95473.561	268			
Behavior Change Effectiveness Score	Between Groups	2027.399	4	506.850	5.597	.000
	Within Groups	23455.415	259	90.561		
	Total	25482.814	263			
CVD Behavior Change Effectiveness Score	Between Groups	173.863	4	43.466	3.190	.014[a]
	Within Groups	3515.011	258	13.624		
	Total	3688.875	262			
Importance of Prevention Counseling Score	Between Groups	198.467	4	49.617	.627	.644
	Within Groups	20656.104	261	79.142		
	Total	20854.571	265			
Importance of CVD Prevention Counseling Score	Between Groups	27.232	4	6.808	.602	.661
	Within Groups	2950.106	261	11.303		
	Total	2977.338	265			
Lifestyle Counseling Effectiveness Score	Between Groups	23.506	4	5.876	.465	.761
	Within Groups	3321.151	263	12.628		
	Total	3344.657	267			
Smoking Cessation Counseling Score	Between Groups	24.048	4	6.012	1.019	.398
	Within Groups	1557.706	264	5.900		
	Total	1581.755	268			
Comfort Discussing Sensitive Topics Score	Between Groups	1.421	4	.355	.032	.998
	Within Groups	2899.087	263	11.023		
	Total	2900.507	267			

[a] The mean difference is not significant at the 0.05 level

Age. As shown in Table 34, the results of the ANOVA revealed no statistically significant difference ($p > .05$) in prevention and counseling attitude scores by age.

Table 34

ANOVA for Prevention and Counseling Attitude Scores by Age

		Sum of Squares	df	Mean Square	*F*	Sig.
Attitude Score	Between Groups	1416.205	3	472.068	1.309	.272
	Within Groups	95902.761	266	360.537		
	Total	97318.967	269			
Behavior Change Effectiveness Score	Between Groups	328.630	3	109.543	1.132	.336
	Within Groups	25153.275	260	96.743		
	Total	25481.905	263			
CVD Behavior Change Effectiveness Score	Between Groups	31.062	3	10.354	.732	.534
	Within Groups	3664.406	259	14.148		
	Total	3695.468	262			
Importance of Prevention Counseling Score	Between Groups	312.124	3	104.041	1.330	.265
	Within Groups	20576.625	263	78.238		
	Total	20888.749	266			
Importance of CVD Prevention Counseling Score	Between Groups	25.289	3	8.430	.751	.523
	Within Groups	2953.977	263	11.232		
	Total	2979.266	266			
Lifestyle Counseling Effectiveness Score	Between Groups	24.609	3	8.203	.654	.581
	Within Groups	3333.998	266	12.534		
	Total	3358.607	269			
Smoking Cessation Counseling Score	Between Groups	2.188	3	.729	.123	.946
	Within Groups	1574.197	266	5.918		
	Total	1576.385	269			
Comfort Discussing Sensitive Topics Score	Between Groups	5.469	3	1.823	.167	.919
	Within Groups	2908.194	266	10.933		
	Total	2913.663	269			

Years licensed. Results of the ANOVA revealed a statistically significant difference ($p < .05$) in the importance of CVD prevention counseling score by years licensed (see Table 36). No other statistically significant differences in prevention and counseling attitude scores by years licensed was found. As shown in Table 35, physician assistants who were licensed for 11–20 years scored highest ($M = 8.37$) and those licensed more than 20 years scored the lowest ($M = 6.59$), $F(3, 262) = 3.751$, $p = .012$. Although there was a mean difference between groups for importance of prevention counseling score, the difference was not statistically significant, but it was close to significance, $F(3, 262) = 2.621$, $p = .051$. Post-hoc analysis, Tukey HSD, revealed mean differences between physician assistants licensed for less than 5 years and those licensed 11–20 years related to importance of CVD prevention counseling score ($p = .018$). No other differences were found.

Table 35

Means for Prevention and Counseling Attitude Scores by Years Licensed

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval	
						Lower Bound	Upper Bound
Importance of Prevention Counseling Score	Less than 5 years	110	20.14	7.276	.694	18.76	21.51
	5–10 years	55	22.09	9.200	1.241	19.60	24.58
	11–20 years	67	22.37	11.786	1.440	19.50	25.25
	More than 20 years	34	17.82	4.674	.802	16.19	19.45
	Total	266	20.81	8.867	.544	19.74	21.88
Importance of CVD Prevention Counseling Score	Less than 5 years	110	6.86	2.293	.219	6.43	7.30
	5–10 years	55	7.71	3.779	.510	6.69	8.73
	11–20 years	67	8.37	4.683	.572	7.23	9.52
	More than 20 years	34	6.59	1.395	.239	6.10	7.08
	Total	266	7.38	3.353	.206	6.98	7.79

Table 36

ANOVA for Prevention and Counseling Attitude Scores by Years Licensed

		Sum of Squares	df	Mean Square	*F*	Sig.
Attitude Score	Between Groups	837.690	3	279.230	.754	.521
	Within Groups	98541.010	266	370.455		
	Total	99378.700	269			
Behavior Change Effectiveness Score	Between Groups	148.703	3	49.568	.510	.676
	Within Groups	25293.782	260	97.284		
	Total	25442.485	263			
CVD Behavior Change Effectiveness Score	Between Groups	1.745	3	.582	.041	.989
	Within Groups	3691.335	259	14.252		
	Total	3693.080	262			
Importance of Prevention Counseling Score	Between Groups	607.109	3	202.370	2.621	.051
	Within Groups	20230.113	262	77.214		
	Total	20837.222	265			
Importance of CVD Prevention Counseling Score	Between Groups	122.680	3	40.893	3.751	.012[a]
	Within Groups	2856.207	262	10.902		
	Total	2978.887	265			
Lifestyle Counseling Effectiveness Score	Between Groups	3.379	3	1.126	.089	.966
	Within Groups	3354.710	265	12.659		
	Total	3358.089	268			
Smoking Cessation Counseling Score	Between Groups	9.106	3	3.035	.508	.677
	Within Groups	1590.113	266	5.978		
	Total	1599.219	269			
Comfort Discussing Sensitive Topics Score	Between Groups	45.699	3	15.233	1.412	.240
	Within Groups	2859.350	265	10.790		
	Total	2905.048	268			

[a] The mean difference is significant at the 0.05 level.

Primary clinical specialty. As shown in Table 38, results of the ANOVA revealed that other than importance of prevention counseling score, $F(4, 261) = .766$, $p = .548$, there were statistically significant differences ($p < .05$) in prevention and counseling attitude scores by specialty. Physician assistants who worked in primary care scored the lowest on each scale, with the exception of comfort discussing sensitive topics; physician assistants in emergency medicine scored lower ($M = 5.15$) vs. ($M = 6.36$). See Table 37 for means by specialty.

Although there was a difference between clinical specialties related to the importance of CVD prevention counseling, post-hoc analysis using Tukey HSD revealed the mean differences were not statistically significant ($p > .05$). However, post-hoc analysis did find statistically significant ($p < .05$) differences between primary care and surgical subspecialties and primary care and other subspecialties for attitude score; primary care and internal medicine subspecialties, primary care and surgical subspecialties, primary care and other subspecialties for behavior change effectiveness score; primary care and surgical subspecialties for CVD behavior change effectiveness score; primary care and emergency medicine, internal medicine subspecialties and emergency medicine, emergency medicine and surgical subspecialties, and emergency medicine and other subspecialties for lifestyle counseling effectiveness score; primary care and emergency medicine for smoking cessation counseling score; and primary care and surgical subspecialties, internal medicine subspecialties and surgical subspecialties, emergency medicine and surgical subspecialties, and surgical subspecialties and other for comfort discussing sensitive topics score.

Table 37

Means for Prevention and Counseling Attitude Scores by Primary Clinical Specialty

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Attitude Score	Primary Care	105	73.71	15.968	1.558	70.62	76.80
	Internal Medicine Subspecialties	35	82.29	19.049	3.220	75.74	88.83
	Emergency Medicine	20	85.60	14.438	3.228	78.84	92.36
	Surgical Subspecialties	64	90.39	19.275	2.409	85.58	95.21
	Other Subspecialties	46	83.74	21.679	3.196	77.30	90.18
	Total	270	81.37	19.221	1.170	79.06	83.67
Behavior Change Effectiveness Score	Primary Care	101	36.77	7.535	.750	35.28	38.26
	Internal Medicine Subspecialties	34	42.76	8.004	1.373	39.97	45.56
	Emergency Medicine	20	42.10	9.301	2.080	37.75	46.45
	Surgical Subspecialties	63	46.08	10.153	1.279	43.52	48.64
	Other Subspecialties	46	41.98	11.559	1.704	38.55	45.41
	Total	264	41.08	9.836	.605	39.88	42.27
CVD Behavior Change Effectiveness Score	Primary Care	101	11.21	2.865	.285	10.64	11.77
	Internal Medicine Subspecialties	34	12.47	3.637	.624	11.20	13.74
	Emergency Medicine	20	13.30	4.566	1.021	11.16	15.44
	Surgical Subspecialties	63	13.57	4.055	.511	12.55	14.59
	Other Subspecialties	45	12.98	4.153	.619	11.73	14.23
	Total	263	12.40	3.754	.232	11.94	12.86
Importance of Prevention Counseling Score	Primary Care	102	19.74	5.529	.547	18.65	20.82
	Internal Medicine Subspecialties	35	20.46	8.675	1.466	17.48	23.44
	Emergency Medicine	20	21.30	7.428	1.661	17.82	24.78
	Surgical Subspecialties	64	21.78	10.191	1.274	19.24	24.33
	Other Subspecialties	45	21.91	12.931	1.928	18.03	25.80
	Total	266	20.81	8.867	.544	19.74	21.88

(table continues)

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Importance of CVD Prevention Counseling Score	Primary Care	102	6.65	1.460	.145	6.36	6.93
	Internal Medicine Subspecialties	35	7.06	3.162	.534	5.97	8.14
	Emergency Medicine	20	7.80	2.913	.651	6.44	9.16
	Surgical Subspecialties	64	8.05	3.893	.487	7.07	9.02
	Other Subspecialties	45	8.18	5.197	.775	6.62	9.74
	Total	266	7.38	3.353	.206	6.98	7.79
Lifestyle Counseling Effectiveness Score	Primary Care	104	13.00	3.650	.358	12.29	13.71
	Internal Medicine Subspecialties	35	13.49	3.625	.613	12.24	14.73
	Emergency Medicine	20	17.05	2.645	.591	15.81	18.29
	Surgical Subspecialties	64	14.31	3.431	.429	13.46	15.17
	Other Subspecialties	46	13.26	2.808	.414	12.43	14.09
	Total	269	13.72	3.540	.216	13.30	14.15
Smoking Cessation Counseling Score	Primary Care	105	7.19	2.321	.226	6.74	7.64
	Internal Medicine Subspecialties	35	7.71	2.334	.394	6.91	8.52
	Emergency Medicine	20	9.35	2.581	.577	8.14	10.56
	Surgical Subspecialties	64	8.00	2.684	.336	7.33	8.67
	Other Subspecialties	46	8.15	1.988	.293	7.56	8.74
	Total	270	7.77	2.438	.148	7.48	8.07
Comfort Discussing Sensitive Topics Score	Primary Care	104	6.36	2.302	.226	5.91	6.80
	Internal Medicine Subspecialties	35	6.80	2.564	.433	5.92	7.68
	Emergency Medicine	20	5.15	1.872	.418	4.27	6.03
	Surgical Subspecialties	64	8.94	4.447	.556	7.83	10.05
	Other Subspecialties	46	7.07	3.235	.477	6.10	8.03
	Total	269	7.06	3.292	.201	6.66	7.45

Table 38

ANOVA for Prevention and Counseling Attitude Scores by Primary Clinical Specialty

		Sum of Squares	df	Mean Square	*F*	Sig.
Attitude Score	Between Groups	12007.225	4	3001.806	9.105	.000
	Within Groups	87371.475	265	329.704		
	Total	99378.700	269			
Behavior Change Effectiveness Score	Between Groups	3603.223	4	900.806	10.683	.000
	Within Groups	21839.261	259	84.321		
	Total	25442.485	263			
CVD Behavior Change Effectiveness Score	Between Groups	261.369	4	65.342	4.913	.001
	Within Groups	3431.711	258	13.301		
	Total	3693.080	262			
Importance of Prevention Counseling Score	Between Groups	241.901	4	60.475	.766	.548
	Within Groups	20595.321	261	78.909		
	Total	20837.222	265			
Importance of CVD Prevention Counseling Score	Between Groups	119.070	4	29.768	2.717	.030[a]
	Within Groups	2859.817	261	10.957		
	Total	2978.887	265			
Lifestyle Counseling Effectiveness Score	Between Groups	309.777	4	77.444	6.707	.000
	Within Groups	3048.312	264	11.547		
	Total	3358.089	268			
Smoking Cessation Counseling Score	Between Groups	95.400	4	23.850	4.203	.003
	Within Groups	1503.818	265	5.675		
	Total	1599.219	269			
Comfort Discussing Sensitive Topics Score	Between Groups	352.507	4	88.127	9.115	.000
	Within Groups	2552.541	264	9.669		
	Total	2905.048	268			

[a] The mean difference is not significant at the 0.05 level.

Practice region. With the exception of importance of prevention counseling score, $F(4, 262) = 3.076$, $p = .017$ and importance of CVD prevention counseling score, $F(4, 262) = 2.821$, $p = .026$ (Table 40), the results of the ANOVA revealed no statistically significant differences ($p > .05$) in prevention and counseling attitude scores by practice region. As noted in Table 39, physician assistants practicing in the Northeast scored the lowest on both scales ($M = 18.76$ and $M = 6.82$, respectively) and those practicing in the Midwest scored the highest ($M = 24.27$ and $M = 8.88$, respectively). Post-hoc analysis, Tukey HSD, revealed that the mean differences between the Northeast and Midwest regions related to importance of prevention counseling and importance of CVD prevention counseling scores were statistically significant ($p < .01$). No other mean differences were found.

Table 39

Means for Prevention and Counseling Attitude Scores by Practice Region

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval	
						Lower Bound	Upper Bound
Importance of Prevention Counseling Score	Northeast	91	18.76	6.071	.636	17.49	20.02
	Midwest	41	24.27	13.762	2.149	19.92	28.61
	South	83	21.08	8.972	.985	19.13	23.04
	West	46	21.04	7.096	1.046	18.94	23.15
	Other/U.S. Territory	6	23.83	6.210	2.535	17.32	30.35
	Total	267	20.84	8.862	.542	19.77	21.90
Importance of CVD Prevention Counseling Score	Northeast	91	6.82	1.987	.208	6.41	7.24
	Midwest	41	8.88	5.533	.864	7.13	10.62
	South	83	7.41	3.589	.394	6.63	8.19
	West	46	7.17	2.194	.323	6.52	7.83
	Other/U.S. Territory	6	7.00	.894	.365	6.06	7.94
	Total	267	7.39	3.347	.205	6.98	7.79

Table 40

ANOVA for Prevention and Counseling Attitude Scores by Practice Region

		Sum of Squares	df	Mean Square	*F*	Sig.
Attitude Score	Between Groups	2619.098	4	654.775	1.800	.129
	Within Groups	96766.511	266	363.784		
	Total	99385.609	270			
Behavior Change Effectiveness Score	Between Groups	113.741	4	28.435	.291	.884
	Within Groups	25393.716	260	97.668		
	Total	25507.457	264			
CVD Behavior Change Effectiveness Score	Between Groups	4.205	4	1.051	.074	.990
	Within Groups	3691.427	259	14.253		
	Total	3695.633	263			
Importance of Prevention Counseling Score	Between Groups	936.863	4	234.216	3.076	.017[a]
	Within Groups	19951.886	262	76.152		
	Total	20888.749	266			
Importance of CVD Prevention Counseling Score	Between Groups	123.008	4	30.752	2.821	.026[a]
	Within Groups	2856.258	262	10.902		
	Total	2979.266	266			
Lifestyle Counseling Effectiveness Score	Between Groups	18.891	4	4.723	.375	.827
	Within Groups	3339.717	265	12.603		
	Total	3358.607	269			
Smoking Cessation Counseling Score	Between Groups	26.236	4	6.559	1.109	.353
	Within Groups	1573.033	266	5.914		
	Total	1599.269	270			
Comfort Discussing Sensitive Topics Score	Between Groups	57.078	4	14.270	1.324	.261
	Within Groups	2856.585	265	10.780		
	Total	2913.663	269			

[a] The mean difference is significant at the 0.05 level.

Practice environment. As shown in Table 42, results of the ANOVA revealed that other than importance of prevention counseling score, $F(4, 265) = .828$, $p = .508$ and importance of CVD counseling, $F(4, 265) = 2.197$, $p = .070$, there were statistically significant differences ($p < .01$) between practice environment groups and attitude score, behavior change effectiveness score and CVD behavior change score. Likewise, there were statistically significant differences ($p < .05$) between practice environment groups and lifestyle counseling effectiveness score, smoking cessation counseling score, and comfort discussing sensitive topics score. Physician assistants who practiced in a hospital setting scored the highest on each scale, with the exception of comfort discussing sensitive topics; physician assistants working in a physician group or solo scored highest ($M = 7.10$) vs. ($M = 7.74$). See Table 41 for means by practice environment group.

Although there was a difference between practice environments related to smoking cessation counseling score, post-hoc analysis using Tukey HSD revealed the mean differences were not statistically significant ($p > .05$). However, post-hoc analysis did find statistically significant ($p < .05$) differences between hospital and community health center for attitude and behavior change effectiveness scores; hospital and certified rural health clinics for attitude and lifestyle counseling effectiveness scores; hospital and physician group/solo practice for behavior change effectiveness, CVD behavior change effectiveness, and lifestyle counseling effectiveness scores; hospital and other for behavior change effectiveness score; and physician group/solo practice and community health center for comfort discussing sensitive topics.

Table 41

Means for Prevention and Counseling Attitude Scores by Practice Environment

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Attitude Score	Hospital	105	86.69	19.848	1.937	82.84	90.53
	Physician Group or Solo Practice	110	80.11	17.799	1.697	76.75	83.47
	Community Health Center	32	76.19	14.036	2.481	71.13	81.25
	Certified Rural Health Clinic	12	70.50	20.084	5.798	57.74	83.26
	Other	15	76.87	25.478	6.578	62.76	90.98
	Total	274	81.57	19.219	1.161	79.29	83.86
Behavior Change Effectiveness Score	Hospital	103	44.31	9.969	.982	42.36	46.26
	Physician Group or Solo Practice	108	39.94	9.128	.878	38.19	41.68
	Community Health Center	31	38.35	8.081	1.451	35.39	41.32
	Certified Rural Health Clinic	11	37.00	7.014	2.115	32.29	41.71
	Other	15	36.80	12.707	3.281	29.76	43.84
	Total	268	41.14	9.804	.599	39.96	42.32
CVD Behavior Change Effectiveness Score	Hospital	102	13.56	4.041	.400	12.77	14.35
	Physician Group or Solo Practice	108	11.75	3.513	.338	11.08	12.42
	Community Health Center	31	11.90	2.879	.517	10.85	12.96
	Certified Rural Health Clinic	11	11.55	3.142	.947	9.43	13.66
	Other	15	11.33	4.047	1.045	9.09	13.57
	Total	267	12.43	3.760	.230	11.97	12.88

(table continues)

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Lifestyle Counseling Effectiveness Score	Hospital	105	14.50	3.528	.344	13.81	15.18
	Physician Group or Solo Practice	110	13.12	3.450	.329	12.47	13.77
	Community Health Center	32	13.94	3.464	.612	12.69	15.19
	Certified Rural Health Clinic	12	11.58	3.118	.900	9.60	13.56
	Other	14	13.71	3.124	.835	11.91	15.52
	Total	273	13.71	3.513	.213	13.29	14.13
Smoking Cessation Counseling Score	Hospital	105	8.24	2.471	.241	7.76	8.72
	Physician Group or Solo Practice	110	7.47	2.384	.227	7.02	7.92
	Community Health Center	32	7.63	2.044	.361	6.89	8.36
	Certified Rural Health Clinic	12	6.25	2.417	.698	4.71	7.79
	Other	15	8.13	2.532	.654	6.73	9.54
	Total	274	7.77	2.422	.146	7.48	8.05
Comfort Discussing Sensitive Topics Score	Hospital	105	7.10	3.239	.316	6.47	7.72
	Physician Group or Solo Practice	110	7.74	3.706	.353	7.04	8.44
	Community Health Center	32	5.69	2.101	.371	4.93	6.45
	Certified Rural Health Clinic	12	7.00	1.651	.477	5.95	8.05
	Other	14	6.86	4.130	1.104	4.47	9.24
	Total	273	7.17	3.368	.204	6.77	7.57

Table 42

ANOVA for Prevention and Counseling Attitude Scores by Practice Environment

		Sum of Squares	df	Mean Square	*F*	Sig.
Attitude Score	Between Groups	5712.112	4	1428.028	4.038	.003
	Within Groups	95130.928	269	353.647		
	Total	100843.040	273			
Behavior Change Effectiveness Score	Between Groups	1903.790	4	475.948	5.268	.000
	Within Groups	23762.101	263	90.350		
	Total	25665.892	267			
CVD Behavior Change Effectiveness Score	Between Groups	215.159	4	53.790	3.974	.004
	Within Groups	3546.167	262	13.535		
	Total	3761.326	266			
Importance of Prevention Counseling Score	Between Groups	257.864	4	64.466	.828	.508
	Within Groups	20638.966	265	77.883		
	Total	20896.830	269			
Importance of CVD Prevention Counseling Score	Between Groups	95.913	4	23.978	2.197	.070
	Within Groups	2892.027	265	10.913		
	Total	2987.941	269			
Lifestyle Counseling Effectiveness Score	Between Groups	159.197	4	39.799	3.336	.011
	Within Groups	3197.360	268	11.930		
	Total	3356.557	272			
Smoking Cessation Counseling Score	Between Groups	63.102	4	15.775	2.759	.028[a]
	Within Groups	1537.949	269	5.717		
	Total	1601.051	273			
Comfort Discussing Sensitive Topics Score	Between Groups	107.917	4	26.979	2.429	.048
	Within Groups	2976.991	268	11.108		
	Total	3084.908	272			

[a] The mean difference is not significant at the 0.05 level.

Hours worked. As shown in Table 43, the results of the ANOVA revealed no statistically significant difference ($p > .05$) in prevention and counseling attitude scores by hours worked.

Table 43

ANOVA for Prevention and Counseling Attitude Scores by Hours Worked

		Sum of Squares	df	Mean Square	*F*	Sig.
Attitude Score	Between Groups	464.481	3	154.827	.416	.741
	Within Groups	100378.559	270	371.772		
	Total	100843.040	273			
Behavior Change Effectiveness Score	Between Groups	216.185	3	72.062	.748	.525
	Within Groups	25449.707	264	96.400		
	Total	25665.892	267			
CVD Behavior Change Effectiveness Score	Between Groups	6.787	3	2.262	.158	.924
	Within Groups	3754.539	263	14.276		
	Total	3761.326	266			
Importance of Prevention Counseling Score	Between Groups	193.302	3	64.434	.828	.480
	Within Groups	20703.528	266	77.833		
	Total	20896.830	269			
Importance of CVD Prevention Counseling Score	Between Groups	12.575	3	4.192	.375	.771
	Within Groups	2975.366	266	11.186		
	Total	2987.941	269			
Lifestyle Counseling Effectiveness Score	Between Groups	56.180	3	18.727	1.526	.208
	Within Groups	3300.377	269	12.269		
	Total	3356.557	272			
Smoking Cessation Counseling Score	Between Groups	5.227	3	1.742	.295	.829
	Within Groups	1595.824	270	5.910		
	Total	1601.051	273			
Comfort Discussing Sensitive Topics Score	Between Groups	11.762	3	3.921	.343	.794
	Within Groups	3073.146	269	11.424		
	Total	3084.908	272			

Number of patients seen. With the exception of behavior change effectiveness score, $F(3, 262) = 2.666$, $p = .048$ and comfort discussing sensitive topics, $F(3, 267) = 3.191$, $p = .024$ (see Table 45), the results of the ANOVA revealed no statistically significant differences ($p > .05$) in prevention and counseling attitude scores by number of patients seen. Table 44 shows physician assistants who saw less than 10 patients daily had the highest scores for behavior change effectiveness and comfort discussing sensitive topics ($M = 45.08$ and $M = 9.04$, respectively). Those who saw more than 30 patients a day, had the lowest scores ($M = 37.52$ and $M = 6.64$). Post-hoc analysis, Tukey HSD, revealed that the mean differences between less than 10 patients and more than 30 for behavior change effectiveness score were statistically significant ($p = .032$). Likewise, the mean differences between less than 10 patients and 10–20 for comfort discussing sensitive topics score were statistically significant ($p = .017$). No other mean differences were found.

Table 44

Means for Prevention and Counseling Attitude Scores by Number of Patients Seen

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval	
						Lower Bound	Upper Bound
Behavior Change Effectiveness Score	Less than 10	25	45.08	9.309	1.862	41.24	48.92
	10–20	153	41.39	9.645	.780	39.85	42.93
	21–30	63	40.44	9.329	1.175	38.10	42.79
	More than 30	25	37.52	11.446	2.289	32.80	42.24
	Total	266	41.15	9.813	.602	39.97	42.33
Comfort Discussing Sensitive Topics Score	Less than 10	26	9.04	4.005	.785	7.42	10.66
	10–20	157	6.94	3.030	.242	6.46	7.42
	21–30	63	7.17	3.825	.482	6.21	8.14
	More than 30	25	6.64	2.984	.597	5.41	7.87
	Total	271	7.17	3.367	.205	6.77	7.57

Table 45

ANOVA for Prevention and Counseling Attitude Scores by Number of Patients Seen

		Sum of Squares	df	Mean Square	*F*	Sig.
Attitude Score	Between Groups	1441.381	3	480.460	1.302	.274
	Within Groups	98887.737	268	368.984		
	Total	100329.118	271			
Behavior Change Effectiveness Score	Between Groups	755.879	3	251.960	2.666	.048[a]
	Within Groups	24760.106	262	94.504		
	Total	25515.985	265			
CVD Behavior Change Effectiveness Score	Between Groups	83.861	3	27.954	2.000	.114
	Within Groups	3647.595	261	13.975		
	Total	3731.457	264			
Importance of Prevention Counseling Score	Between Groups	159.163	3	53.054	.677	.567
	Within Groups	20688.523	264	78.366		
	Total	20847.687	267			
Importance of CVD Prevention Counseling Score	Between Groups	26.044	3	8.681	.774	.509
	Within Groups	2959.597	264	11.211		
	Total	2985.642	267			
Lifestyle Counseling Effectiveness Score	Between Groups	51.687	3	17.229	1.410	.240
	Within Groups	3263.103	267	12.221		
	Total	3314.790	270			
Smoking Cessation Counseling Score	Between Groups	1.656	3	.552	.093	.964
	Within Groups	1586.752	268	5.921		
	Total	1588.408	271			
Comfort Discussing Sensitive Topics Score	Between Groups	105.907	3	35.302	3.191	.024[a]
	Within Groups	2954.285	267	11.065		
	Total	3060.192	270			

[a] The mean difference is significant at the 0.05 level.

Perceived Barriers to the Delivery of Clinical Preventive Services

Perceived barriers to the delivery of clinical preventive services were assessed with the barrier scale of the PMAAQ. The scale includes 11 items and uses a 5-point Likert scale range of *not important to very important*. Lower numbers indicate fewer barriers to providing preventive services.

Barriers to the provision of preventive services. Not surprising, physician assistants felt the lack of time ($M = 3.97$) was a moderately important barrier to the provision of preventive services. They also felt that uncertainty about what services to provide ($M = 2.65$) and personal lack of interest ($M = 2.49$) were minimally important barriers. Cultural differences ($M = 3.10$); communication difficulties ($M = 3.14$), lack of proper education materials ($M = 3.15$); insufficient reimbursement ($M = 3.19$); lack of tracking systems ($M = 3.41$), lack of patient interest in prevention ($M = 3.55$), lack of available health educators ($M = 3.56$), and different purpose for patient visit ($M = 3.62$) were viewed as somewhat important (see Table 46).

Table 46

Means for PMAAQ Barrier Scale Items

	N	*M*	*SD*
Lack of Time	273	3.97	1.08
Lack of Availability of Health Educators	271	3.56	1.12
Insufficient Reimbursement for Preventive Services	273	3.19	1.37
Lack of Systems for Tracking and Promoting Preventive Care	273	3.41	1.12
Personal Lack of Interest in Providing Preventive Services	270	2.49	1.37
Lack of Patient Interest in Prevention	273	3.55	1.17
Uncertainty About What Preventive Services to Provide	273	2.65	1.18
Lack of Proper Patient Education Materials	272	3.15	1.27
Communication Difficulties With Patients	271	3.14	1.32
Cultural Differences Between Providers and Patients	273	3.10	1.28
The Patient Came for a Different Purpose	272	3.62	1.24

Overall perceived barriers to the delivery of clinical preventive services. Table 47 shows that, in general, physician assistants believe barriers to the delivery of clinical preventive services exist, and that the barriers are somewhat important (M = 35.73). These results indicate that some barriers may hinder physician assistants from providing effective health promotion and disease prevention to their patients.

Table 47

Mean of Barrier Scale Summary Score

	N	Min	Max	*Mean*	*SD*
Barrier Scale	**273**	**11**	**55**	**35.73**	**8.66**

Difference between the means. Independent-samples t test and ANOVA were conducted to determine if differences between the means of physician assistants' personal and professional characteristics on perceived barriers to the delivery of clinical preventive services existed.

Gender. The results of the independent-samples t test for gender revealed no statistical significance between the perceived barrier scores of men and women. Although men scored lower (M = 35.69) than women (M = 35.87), the difference was not statistically significant, $t(266) = -.158$, $p = .874$ (see Table 48 and Table 49).

Table 48

Means for Perceived Barriers by Gender

	Gender	*N*	Mean	Std. Deviation	Std. Error Mean
Barrier Score	Male	85	35.69	8.867	.962
	Female	183	35.87	8.590	.635

Table 49

Independent-Samples t test for Perceived Barriers by Gender

		Levene's Test for Equality of Variances		*t* test for Equality of Means						
		F	Sig.	*t*	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval	
									Lower	Upper
Barrier Score	Equal variances assumed	.050	.823	-.158	266	.874	-.180	1.139	-2.423	2.063

Race/ethnicity. The results of the ANOVA in Table 51 revealed a statistically significant difference in perceived barrier scores by race/ethnicity. Physician assistants who identified as being American Indian or Alaska Native; Native Hawaiian or Other Pacific Islander, or Multi-racial/Multi-ethnic (grouped as Other), scored lowest (M = 34.08) and those who identified as being Hispanic/Latino, scored the highest (M = 41.64). The difference in group means (Table 50) was statistically significant, $F(4, 261) = 3.770$, $p = .005$. Post-hoc analysis, Tukey HSD, revealed mean differences between physician assistants identifying as Hispanic/Latino and those identifying as White/Caucasian (p = .035).

Table 50

Means for Perceived Barriers by Race/Ethnicity

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Asian	10	40.20	6.941	2.195	35.23	45.17
Black/African American	28	38.57	8.821	1.667	35.15	41.99
Hispanic/Latino	14	41.64	9.394	2.511	36.22	47.07
White or Caucasian, not Hispanic	202	34.88	8.376	.589	33.72	36.04
Other[a]	12	34.08	10.122	2.922	27.65	40.51
Total	266	35.79	8.688	.533	34.74	36.84

[a] Other: American Indian or Alaska Native; Native Hawaiian or Other Pacific Islander; Multi-racial/Multi-ethnic

Table 51

ANOVA for Perceived Barriers by Race/Ethnicity

	Sum of Squares	df	Mean Square	*F*	Sig.
Between Groups	1092.474	4	273.118	3.770	.005
Within Groups	18909.737	261	72.451		
Total	20002.211	265			

Note. The mean difference is significant at the 0.05 level.

Age. The results of the ANOVA revealed no statistically significant difference ($p > .05$) in perceived barrier scores by age (see Table 53). Although there were differences in group means (Table 52), the differences were not statistically significant, $F(3, 259) = .604$, $p = .613$.

Table 52

Means for Perceived Barriers by Age

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
30 or younger	84	36.74	7.876	.859	35.03	38.45
31–45	103	35.26	8.869	.874	33.53	37.00
46–64	76	35.45	9.311	1.068	33.32	37.58
65 or older	4	38.25	8.539	4.270	24.66	51.84
Total	267	35.82	8.678	.531	34.78	36.87

Table 53

ANOVA for Perceived Barriers by Age

	Sum of Squares	df	Mean Square	*F*	Sig.
Between Groups	137.027	3	45.676	.604	.613
Within Groups	19893.700	263	75.641		
Total	20030.727	266			

Years licensed. The results of the ANOVA revealed no statistically significant difference ($p > .05$) in perceived barrier scores by years licensed (see Table 55). Although there were differences in group means (Table 54), the differences were not statistically significant, $F(3, 263) = .776$, $p = .509$.

Table 54

Means for Perceived Barriers by Years Licensed

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval	
					Lower Bound	Upper Bound
Less than 5 years	111	36.12	7.980	.757	34.62	37.62
5–10 years	56	36.82	7.734	1.034	34.75	38.89
11–20 years	68	35.31	9.797	1.188	32.94	37.68
More than 20 years	32	34.13	10.051	1.777	30.50	37.75
Total	267	35.82	8.678	.531	34.77	36.87

Table 55

ANOVA for Perceived Barriers by Years Licensed

	Sum of Squares	df	Mean Square	*F*	Sig.
Between Groups	175.664	3	58.555	.776	.509
Within Groups	19857.706	263	75.505		
Total	20033.371	266			

Primary clinical specialty. The results of the ANOVA revealed no statistically significant difference ($p > .05$) in perceived barrier scores by primary clinical specialty (see Table 57). Although there were differences in group means (Table 56), the differences were not statistically significant, $F(4, 262) = .642$, $p = .633$.

Table 56

Means for Perceived Barriers by Primary Clinical Specialty

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval	
					Lower Bound	Upper Bound
Primary Care	104	35.96	8.241	.808	34.36	37.56
Internal Medicine Subspecialties	35	33.94	8.554	1.446	31.00	36.88
Emergency Medicine	20	37.05	8.294	1.855	33.17	40.93
Surgical Subspecialties	63	35.60	9.021	1.136	33.33	37.87
Other Subspecialties	45	36.71	9.538	1.422	33.85	39.58
Total	267	35.82	8.678	.531	34.77	36.87

Table 57

ANOVA for Perceived Barriers by Primary Clinical Specialty

	Sum of Squares	df	Mean Square	*F*	Sig.
Between Groups	194.365	4	48.591	.642	.633
Within Groups	19839.006	262	75.721		
Total	20033.371	266			

Practice region. The results of the ANOVA revealed no statistically significant difference ($p > .05$) in perceived barrier scores by practice region (see Table 59). Although there were differences in group means (Table 58), the differences were not statistically significant, $F(4, 263) = 1.536$, $p = .192$.

Table 58

Means for Perceived Barriers by Practice Region

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval Lower Bound	Upper Bound
Northeast	90	36.43	7.844	.827	34.79	38.08
Midwest	41	34.32	9.015	1.408	31.47	37.16
South	85	34.66	9.126	.990	32.69	36.63
West	46	37.70	8.648	1.275	35.13	40.26
Other/U.S. Territory	6	38.83	9.888	4.037	28.46	49.21
Total	268	35.82	8.662	.529	34.78	36.86

Table 59

ANOVA for Perceived Barriers by Practice Region

	Sum of Squares	df	Mean Square	*F*	Sig.
Between Groups	457.385	4	114.346	1.536	.192
Within Groups	19576.656	263	74.436		
Total	20034.041	267			

Practice environment. The results of the ANOVA revealed no statistically significant difference ($p > .05$) in perceived barrier scores by practice environment (see Table 61). Although there were differences in group means (Table 60), the differences were not statistically significant, $F(4, 266) = 1.235$, $p = .296$.

Table 60

Means for Perceived Barriers by Practice Environment

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval	
					Lower Bound	Upper Bound
Hospital	104	34.99	8.768	.860	33.29	36.70
Physician Group or Solo Practice	109	36.13	8.557	.820	34.50	37.75
Community Health Center	32	34.41	8.991	1.589	31.16	37.65
Certified Rural Health Clinic	12	36.67	5.211	1.504	33.36	39.98
Other	14	39.71	8.324	2.225	34.91	44.52
Total	271	35.70	8.584	.521	34.67	36.72

Table 61

ANOVA for Perceived Barriers by Practice Environment

	Sum of Squares	df	Mean Square	*F*	Sig.
Between Groups	362.753	4	90.688	1.235	.296
Within Groups	19532.435	266	73.430		
Total	19895.188	270			

Hours worked. The results of the ANOVA revealed no statistically significant difference ($p > .05$) in perceived barrier scores by hours worked (see Table 63). Although there were differences in group means (Table 62), the differences were not statistically significant, $F(3, 267) = .450$, $p = .718$.

Table 62

Means for Perceived Barriers by Hours Worked

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Less than 20	16	34.06	10.969	2.742	28.22	39.91
20-30	13	35.00	7.416	2.057	30.52	39.48
31-40	83	35.24	8.629	.947	33.36	37.13
More than 40	159	36.16	8.429	.668	34.84	37.48
Total	271	35.70	8.584	.521	34.67	36.72

Table 63

ANOVA for Perceived Barriers by Hours Worked

	Sum of Squares	df	Mean Square	*F*	Sig.
Between Groups	100.001	3	33.334	.450	.718
Within Groups	19795.187	267	74.139		
Total	19895.188	270			

Number of patients seen. The results of the ANOVA revealed no statistically significant difference ($p > .05$) in perceived barrier scores by number of patients seen (see Table 65). Although there were differences in group means (Table 64), the differences were not statistically significant, $F(3, 265) = 1.382$, $p = .249$.

Table 64

Means for Perceived Barriers by Number of Patients Seen

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Less than 10	25	35.40	8.921	1.784	31.72	39.08
10–20	155	35.48	8.082	.649	34.20	36.76
21–30	64	35.19	8.826	1.103	32.98	37.39
More than 30	25	39.04	10.482	2.096	34.71	43.37
Total	269	35.73	8.599	.524	34.70	36.76

Table 65

ANOVA for Perceived Barriers by Number of Patients Seen

	Sum of Squares	df	Mean Square	*F*	Sig.
Between Groups	305.348	3	101.783	1.382	.249
Within Groups	19513.381	265	73.635		
Total	19818.729	268			

Instrument Reliability

Reliability analysis for all scales was again investigated with Cronbach's alpha (α); results confirmed the pilot study findings, which indicated a high level of internal consistency for each scale. On the behavior scale, reliability coefficients ranged from .72 for harmful activities to .96 for CVD prevention, with an overall reliability of .97. Reliability coefficients for the attitude scale ranged from .519 for smoking cessation counseling to .97 for the importance of counseling for CVD, with an overall reliability of .92. The overall reliability coefficient for the barrier scale was .85 (see Table 66).

Table 66

Reliability Coefficients

Theme/Scale/Subscale	*N* of Items	Cronbach's Alpha (α)
Behavior Scale	37	**.97**
Overall Prevention Behavior	26	.95
Primary Prevention	16	.93
CVD Prevention	11	.96
Harmful Activities	4	.72
Substance Use	3	.86
Cancer Screening	3	.90
Smoking Cessation	7	.85
Hypertension Management	4	.95
Attitude Scale	36	**.92**
Behavior Change Effectiveness	12	.92
CVD Behavior Change Effectiveness	4	.90
Importance of Prevention Counseling	15	.97
Importance of Counseling for CVD	6	.97
Lifestyle Counseling Effectiveness	5	.61
Smoking Cessation Counseling	3	.52
Comfort Discussing Sensitive Topics	4	.86
Barrier Scale	11	**.85**

Hypotheses Testing

Research Question 1. *Is there a relationship between physician assistants' personal health habits (body mass index, tobacco use, alcohol consumption, diet, physical activity, and regular source of care) and their preventive medicine practices?*

The relationship between physician assistants' personal health habits and their preventive medicine practices was examined using Pearson's and Spearman's correlations (see Table 67 and Table 68). Results indicate there was a statistically significant relationship between healthful eating plan and behavior score, $r(272) = .140$, $p = .020$; overall prevention behavior score, $r(272) = .147$, $p = .015$; primary prevention score, $r(272) = .171$, $p = .005$; CVD prevention score, $r(272) = .184$, $p = .002$; harmful activities score, $r(270) = .125$, $p = .039$, and substance use score, $r(270) = .122$, $p = .045$. This suggests that as healthful eating days increased, so did the aforementioned preventive medicine practice scores. Additionally, there was a statistically significant relationship between alcohol consumption and cancer screening score, $r_s(270) = -.164$, $p = .007$. This suggests that as alcohol consumption increased, cancer screening scores decreased. The results also suggest that there was a relationship between BMI and overall prevention behavior score, physical activity and CVD prevention score, physical activity and smoking cessation score, healthful eating plan and smoking cessation score, healthful eating plan and hypertension management score, and regular source of care and smoking cessation score; however, none of these relationships were statistically significant ($r(273) = .105$, $p = .083$; $r_s(274) = .117$, $p = .052$; $r_s(269) = .103$, $p = .090$; $r(267) = .117$, $p = .054$; $r(269) = .109$, $p = .074$, and $r_s(269) = -.106$, $p = .081$, respectively). There were no relationships with tobacco use.

Table 67

Pearson's Correlation of Healthful Eating Plan with Preventive Medicine Practice Scores

		Behavior Score	Overall Prevention Behavior Score	Primary Prevention Score	CVD Prevention Score	Harmful Activities Score	Substance Use Score	Cancer Screening Score	Smoking Cessation Score	Hypertension Management Score
Healthful Eating Plan	Pearson Correlation	.140*	.147*	.171**	.184**	.125*	.122*	.013	.117	.109
	Sig. (2-tailed)	.020	.015	.005	.002	.039	.045	.828	.054	.074
	N	274	274	274	274	272	272	272	269	271

Note. *Correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level (2-tailed).

Table 68

Spearman's Correlation of Alcohol Status with Preventive Medicine Practice Scores

		Behavior Score	Overall Prevention Behavior Score	Primary Prevention Score	CVD Prevention Score	Harmful Activities Score	Substance Use Score	Cancer Screening Score	Smoking Cessation Score	Hypertension Management Score
Alcohol Status	Spearman's rho	-.067	-.069	-.018	.006	-.057	-.018	-.164**	-.022	-.084
	Sig. (2-tailed)	.271	.255	.772	.921	.349	.765	.007	.716	.167
	N	274	274	274	274	272	272	272	269	271

Note. **Correlation is significant at the 0.01 level (2-tailed).

In order to assess the predictive relationship between physician assistants' personal health habits and their preventive medicine practices, body mass index, smoking status, exercise frequency, alcohol consumption, diet-related health habits (healthful eating days, five or more servings of fruit and vegetables, high fat foods), and regular source of care were entered into a stepwise multiple regression. Categorical variables were dummy coded and the assumptions of linearity, independence of residuals, homoscedasticity, multicollinearity, and normality were assessed and met prior to the analysis.

Regression analysis revealed that regular source of care from a clinician within the physician assistant's own practice ($B = 15.975$), healthful eating days ($B = 3.516$), and consuming 3–4 drinks per week ($B = -24.338$) were the only significant personal health habits ($p < .05$) in predicting physician assistants' preventive medicine practices. The results were statistically significant, $F(3, 268) = 5.700$, $p < .01$, $R^2 = .060$. Therefore, personal health habits accounted for 6% of the variance in predicting physician assistants' preventive medicine practices. The regression equation is:

Preventive Medicine Practices = 125.102 + 15.975 Regular Source of Care + 3.516 Healthful Eating Days − 24.338 Alcohol Consumption

The equation indicates that in order to predict a physician assistants' preventive medicine practices from their personal health habits, 15.975 points would be added to their behavior score (higher scores represent more preventive medicine practices) if they obtained regular care from a clinician within their own practice; 3.516 points would be added for each day they followed a healthful eating plan, and 24.338 points would be subtracted if they consumed 3–4 drinks per week. The excluded variables due to

nonsignificance ($p > .05$) were body mass index, smoking status, exercise frequency, five or more servings of fruit and vegetables, and high fat foods. Results of the regression analysis are presented in Table 69.

Table 69

Stepwise Multiple Regression Analysis for Personal Health Habits Predicting Preventive Medicine Practices

Model		*B*	SE_B	β	t	Sig.
1	(Constant)	137.505	3.495		39.338	.000
	RSOC_OwnPrac	16.531	6.343	.157	2.606	.010
2	(Constant)	123.938	6.693		18.518	.000
	RSOC_OwnPrac	16.999	6.292	.162	2.702	.007
	Healthful Eating Days	3.325	1.403	.142	2.370	.019
3	(Constant)	125.102	6.674		18.746	.000
	RSOC_OwnPrac	15.975	6.271	.152	2.547	.011
	Healthful Eating Days	3.516	1.397	.150	2.516	.012
	Alch_3–4	-24.338	11.581	-.126	-2.101	.037

Note. B = unstandardized coefficient; SE_B = standard error of the coefficient; β = standardized coefficient.

Based on the results of Research Question 1, the null hypothesis is rejected in favor of the alternative hypothesis that there is a statistically significant and predictive relationship between physician assistants' personal health habits and their preventive medicine practices.

Research Question 2. *Is there a relationship between physician assistants' prevention and counseling attitudes (perceived importance of, effectiveness of, and comfort in delivering preventive care) and their preventive medicine practices?*

The relationship between physician assistants' prevention and counseling attitudes and their preventive medicine practices was examined using Pearson's correlation. Of the 72 relationships analyzed, 68 were statistically significant; one was not statistically significant, and three did not have any relation (see Table 70). Of the 68 that were statistically significant, importance of prevention counseling score and CVD prevention score, $r(270) = -.141$, $p = .020$; importance of prevention counseling score and hypertension management score, $r(268) = -.138$, $p = .023$; importance of CVD prevention counseling score and harmful activities score, $r(268) = -.121$, $p = .047$, and importance of CVD prevention counseling score and lifestyle counseling effectiveness score, $r(271) = -.144$, $p = .018$, were significant at the .05 level (2-tailed); the rest were significant at the .01 level (2-tailed). This suggests that as the aforementioned prevention and counseling attitude scores increased, the corresponding preventive medicine practice scores decreased. Although not statistically significant, there was a relationship between importance of prevention counseling score and substance use that approached statistical significance, $r(268) = -.116$, $p = .057$. There were no relationships between importance of prevention counseling score and smoking cessation score, importance of CVD prevention counseling score and smoking cessation counseling effectiveness score, or importance of CVD prevention counseling score and substance use.

Table 70

Pearson's Correlation of Prevention and Counseling Attitude Scores with Preventive Medicine Practice Scores

		Behavior Score	Overall Prevention Behavior Score	Primary Prevention Score	CVD Prevention Score	Harmful Activities Score	Substance Use Score	Cancer Screening Score	Smoking Cessation Score	Hypertension Management Score
Attitude Score	Pearson Correlation	-.534**	-.534**	-.523**	-.493**	-.430**	-.298**	-.390**	-.366**	-.512**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	276	276	276	276	274	274	274	273	274
Behavior Change Effectiveness Score	Pearson Correlation	-.670**	-.666**	-.647**	-.629**	-.486**	-.312**	-.466**	-.509**	-.598**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	270	270	270	270	268	268	268	267	268
CVD Behavior Change Effectiveness Score	Pearson Correlation	-.604**	-.584**	-.595**	-.636**	-.354**	-.274**	-.377**	-.479**	-.551**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	269	269	269	269	267	267	267	266	267
Importance of Prevention Counseling Score	Pearson Correlation	-.169**	-.183**	-.167**	-.141*	-.165**	-.116	-.160**	-.090	-.138*
	Sig. (2-tailed)	.005	.002	.006	.020	.007	.057	.009	.139	.023
	N	272	272	272	272	270	270	270	269	270
Importance of CVD Prevention Counseling Score	Pearson Correlation	-.180**	-.188**	-.182**	-.181**	-.121*	-.081	-.189**	-.085	-.200**
	Sig. (2-tailed)	.003	.002	.003	.003	.047	.183	.002	.163	.001
	N	272	272	272	272	270	270	270	269	270

(table continues)

		Behavior Score	Overall Prevention Behavior Score	Primary Prevention Score	CVD Prevention Score	Harmful Activities Score	Substance Use Score	Cancer Screening Score	Smoking Cessation Score	Hypertension Management Score
Lifestyle Counseling Effectiveness Score	Pearson Correlation	-.297**	-.297**	-.323**	-.339**	-.176**	-.144*	-.217**	-.211**	-.273**
	Sig. (2-tailed)	.000	.000	.000	.000	.003	.018	.000	.000	.000
	N	275	275	275	275	273	273	273	272	273
Smoking Cessation Counseling Score	Pearson Correlation	-.458**	-.427**	-.450**	-.457**	-.288**	-.299**	-.261**	-.370**	-.469**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	276	276	276	276	274	274	274	273	274
Comfort Discussing Sensitive Topics Score	Pearson Correlation	-.313**	-.314**	-.331**	-.255**	-.355**	-.295**	-.217**	-.194**	-.349**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.001	.000
	N	275	275	275	275	273	273	273	272	273

Note. *Correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level (2-tailed).

Simple linear regression analysis was conducted to assess the predictive relationship between prevention and counseling attitudes and preventive medicine practices. Results were statistically significant, $F(1, 274) = 109.287$, $p < .0001$, $R^2 = .285$. Collectively, the prevention and counseling attitudes score accounted for approximately 29% of the explained variability in predicting physician assistants' preventive medicine practices. The regression equation is:

Prevention Medicine Practices = 252.365 − 1.327 Attitude Score

The equation indicates that for every unit change in attitude score, preventive medicine practices scores decreased by 1.327. Results of the regression analysis are presented in Table 71.

Table 71

Simple Linear Regression Analysis for Prevention and Counseling Attitudes Predicting Preventive Medicine Practice Scores

Model		*B*	SE_B	β	t	Sig.
1	(Constant)	252.365	10.628		23.745	.000
	Attitude Score	-1.327	.127	-.534	-10.454	.000

Note. *B* = unstandardized coefficient; SE_B = standard error of the coefficient; β = standardized coefficient

To further assess the predictive relationship between specific prevention and counseling attitudes and preventive medicine practices, each of the seven attitude scores (behavior change effectiveness, CVD behavior change effectiveness, importance of prevention counseling, importance of CVD prevention counseling, lifestyle counseling effectiveness, smoking cessation counseling effectiveness, and comfort discussing sensitive topics) were entered into a stepwise multiple regression analysis. Prior to the analysis, the assumptions of linearity, independence of residuals, homoscedasticity, multicollinearity, and normality were assessed and met.

Regression analysis revealed that behavior change effectiveness ($B = -3.141$) and smoking cessation counseling effectiveness ($B = -3.051$) were the only significant prevention and counseling attitudes ($p < .05$) in predicting physician assistants' preventive medicine practices. The results were statistically significant, $F(2, 265) = 139.423$, $p < .0001$, $R^2 = .513$. Therefore, prevention and counseling attitudes accounted for 51% of the variance in predicting physician assistants' preventive medicine practices. The regression equation is:

Preventive Medicine Practices = 297.666 − 3.141 Behavior Change Effectiveness − 3.051 Smoking Cessation Counseling Effectiveness.

The equation indicates that for every unit change in behavior change effectiveness and smoking cessation counseling effectiveness, preventive medicine practice scores decreased by 3.141 and 3.051, respectively. The excluded variables due to nonsignificance ($p > .05$) were CVD behavior change effectiveness, importance of prevention counseling, importance of CVD prevention counseling, lifestyle counseling

effectiveness, and comfort discussing sensitive topics. Results of the regression analysis are presented in Table 72.

Table 72

Stepwise Multiple Regression Analysis for Prevention and Counseling Attitudes Predicting Preventive Medicine Practice Scores

Model		*B*	SE_B	β	t	Sig.
1	(Constant)	289.611	9.221		31.409	.000
	Behavior Change Effectiveness Score	-3.529	.218	-.705	-16.192	.000
2	(Constant)	297.666	9.480		31.398	.000
	Behavior Change Effectiveness Score	-3.141	.251	-.627	-12.504	.000
	Smoking Cessation Counseling Score	-3.051	1.024	-.149	-2.981	.003

Note. *B* = unstandardized regression coefficient; SE_B = standard error of the coefficient; β = standardized coefficient.

Based on the results of Research Question 2, the null hypothesis is rejected in favor of the alternative hypothesis that there is a statistically significant and predictive relationship between physician assistants' prevention and counseling attitudes and their preventive medicine practices.

Research Question 3. *Is there a relationship between physician assistants' perceived barriers to the delivery of clinical preventive services and their preventive medicine practices?*

The relationship between physician assistants' perceived barriers to the delivery of clinical preventive services and their preventive medicine practices was examined using Pearson's correlation. As indicated in Table 73, there was a statistically significant relationship between barrier score and behavior score, $r(271) = .163$, $p = .007$; overall prevention behavior score, $r(271) = .153$, $p = .011$; primary prevention score, $r(271) = .145$, $p = .017$; CVD prevention score, $r(271) = .181$, $p = .003$; smoking cessation counseling effectiveness score, $r(268) = .139$, $p = .022$, and hypertension management score, $r(269) = .143$, $p = .018$. This suggests that as perceived barrier scores increased, so did the aforementioned preventive medicine practice scores. There were no relationships between barrier score and harmful activity, substance use, or cancer screening scores.

Table 73

Pearson's Correlation of Barrier Scores with Preventive Medicine Practice Scores

		Behavior Score	Overall Prevention Behavior Score	Primary Prevention Score	CVD Prevention Score	Harmful Activities Score	Substance Use Score	Cancer Screening Score	Smoking Cessation Score	Hypertension Management Score
Barrier Score	Pearson Correlation	.163**	.153*	.145*	.181**	.080	-.020	.088	.139*	.143*
	Sig. (2-tailed)	.007	.011	.017	.003	.187	.745	.146	.022	.018
	N	273	273	273	273	271	271	271	270	271

Note. *Correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level (2-tailed).

Simple linear regression analysis was conducted to assess the predictive relationship between perceived barriers to the delivery of clinical preventive services and preventive medicine practices. Results were statistically significant, $F(1, 271) = 7.442$, $p < .01$, $R^2 = .027$. Collectively, the perceived barriers scores accounted for approximately 3% of the explained variability in predicting physician assistants' preventive medicine practices. The regression equation is:

Prevention Medicine Practices = 112.832 + .895 Barrier Score

The equation indicates that for every unit change in barrier score, preventive medicine practices scores increased by .895. Results of the regression analysis are presented in Table 74.

Table 74

Simple Linear Regression Analysis for Perceived Barriers to the Delivery of Clinical Preventive Services Predicting Preventive Medicine Practices

Model		*B*	SE_B	β	t	Sig.
1	(Constant)	112.832	12.055		9.360	.000
	Barrier Score	.895	.328	.163	2.728	.007

Note. *B* = unstandardized coefficient; SE_B = standard error of the coefficient; β = standardized coefficient

To further assess the predictive relationship between specific barriers and preventive medicine practices, each of the 11 barrier scores (lack of time, lack of health educators, insufficient reimbursement, lack of systems, personal lack of interest, lack of patient interest, uncertainty about services, lack of education materials, communication difficulties, cultural differences, and purpose of visit) were entered into a stepwise multiple regression analysis. Prior to the analysis, the assumptions of linearity, independence of residuals, homoscedasticity, multicollinearity, and normality were assessed and met.

Regression analysis revealed that cultural differences between providers and patients ($B = 8.800$) and patient came for a different purpose ($B = -5.169$) were the only significant barriers ($p < .05$) in predicting physician assistants' preventive medicine practices. The results were statistically significant, $F(2, 261) = 7.851$, $p < .0001$, $R^2 = .057$. Therefore, perceived barriers to the delivery of clinical preventive services accounted for approximately 6% of the variance in predicting physician assistants' preventive medicine practices. The regression equation is:

Preventive Medicine Practices = 136.832 + 8.800 Cultural Differences between Providers and Providers − 5.169 Patient Came for a Different Purpose.

The equation indicates that for every unit change in cultural differences between providers and patients and the patient came for a different purpose, behavior scores (preventive medicine practices) increased by 8.800 and decreased by 5.169, respectively. The excluded variables due to nonsignificance ($p > .05$) were lack of time, lack of health educators, insufficient reimbursement, lack of systems, personal lack of interest, lack of

patient interest, uncertainty about services, lack of education materials, and communication difficulties. Results of the regression analysis are presented in Table 75.

Table 75

Stepwise Multiple Regression Analysis for Perceived Barriers to the Delivery of Clinical Preventive Services Predicting Preventive Medicine Practices

Model		*B*	SE_B	β	t	Sig.
1	(Constant)	122.123	7.587		16.097	.000
	Cultural Differences Between Providers and Patients	7.481	2.257	.201	3.314	.001
2	(Constant)	136.832	10.205		13.408	.000
	Cultural Differences Between Providers and Patients	8.800	2.325	.236	3.784	.000
	The Patient Came for a Different Purpose	-5.169	2.418	-.133	-2.137	.033

Note. *B* = unstandardized regression coefficient; SE_B = standard error of the coefficient; β = standardized coefficient.

Based on the results of Research Question 3, the null hypothesis is rejected in favor of the alternative hypothesis that there is a statistically significant and predictive relationship between physician assistants' perceived barriers to the delivery of clinical preventive services and their preventive medicine practices.

Research Question 4. *Is there a relationship between physician assistants' personal health habits (body mass index, tobacco use, alcohol consumption, diet, physical activity, and regular source of care) and their prevention and counseling attitudes (perceived importance of, effectiveness of, and comfort in delivering preventive care)?*

The relationship between physician assistants' personal health habits and their prevention and counseling attitudes was examined using Pearson's and Spearman's correlations (see Table 76, Table 77, and Table 78). Results indicate there was a statistically significant relationship between BMI and importance of prevention counseling, $r(266) = -.144$, $p = .019$. This suggests that as BMI increased, importance of prevention counseling score decreased. Results also show a statistically significant relationship between exercise status and behavior change effectiveness score, $r_s(265) = -.126$, $p = .041$ and exercise status and CVD behavior change effectiveness score, $r_s(264) = -.180$, $p < .01$. This suggests that as exercise days increased, the aforementioned prevention and counseling attitude scores decreased. With regard to diet, there was a statistically significant relationship between healthful eating plan and attitude score, $r(269) = -.198$, $p < .01$; behavior change effectiveness score, $r(263) = -.192$, $p < .01$; CVD behavior change effectiveness score, $r(262) = -.250$, $p < .001$, and smoking cessation score, $r(269) = -.150$, $p = .013$. This suggests that as healthful eating days increased, the aforementioned prevention and counseling attitude scores decreased. Additionally, there was a statistically significant relationship between eating five plus servings of fruits and vegetables and behavior change effectiveness score, $r(264) = -.147$, $p = .017$ and CVD behavior change effectiveness score, $r(263) = -.196$, $p < .01$. This

suggests that as five plus serving days increased, the aforementioned prevention and counseling attitude scores decreased. The results also suggest that there was a relationship between exercise and attitude score, alcohol consumption and importance of CVD prevention counseling, healthful eating plan and importance of prevention counseling score, healthful eating plan and comfort discussing sensitive topics score, and five plus servings of fruits and vegetables and attitude score; however, none of these relationships were statistically significant ($r_s(271) = -.116$, $p = .057$; $r(265) = .114$, $p = .064$; $r(265) = -.101$, $p = .101$; $r(268) = -.109$, $p = .074$, and $r(270) = -.119$, $p = .050$, respectively). There were no relationships between tobacco use or RSOC and any prevention and counseling attitude scores.

Based on the results of Research Question 4, the null hypothesis is rejected in favor of the alternative hypothesis that there is a statistically significant relationship between physician assistants' personal health habits and their prevention and counseling attitudes.

Table 76

Pearson's Correlation of BMI with Prevention and Counseling Attitude Scores

		Attitude Score	Behavior Change Effectiveness Score	CVD Behavior Change Effectiveness Score	Importance of Prevention Counseling Score	Importance of CVD Counseling Score	Lifestyle Counseling Effectiveness Score	Smoking Cessation Counseling Score	Comfort Discussing Sensitive Topics Score
Body Mass Index (BMI)	Pearson Correlation	-.079	-.074	-.072	-.144*	-.091	-.054	-.046	-.002
	Sig. (2-tailed)	.198	.231	.243	.019	.141	.380	.456	.971
	N	270	264	263	266	266	269	270	269

Note. *Correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level (2-tailed).

Table 77

Spearman's Correlation of Exercise with Prevention and Counseling Attitude Scores

			Attitude Score	Behavior Change Effectiveness Score	CVD Behavior Change Effectiveness Score	Importance of Prevention Counseling Score	Importance of CVD Counseling Score	Lifestyle Counseling Effectiveness Score	Smoking Cessation Counseling Score	Comfort Discussing Sensitive Topics Score
Spearman's rho	Exercise	Correlation Coefficient	-.116	-.126*	-.180**	-.063	-.026	-.009	-.099	-.019
		Sig. (2-tailed)	.057	.041	.003	.304	.671	.881	.102	.758
		N	271	265	264	267	267	270	271	270

Note. *Correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level (2-tailed).

Table 78

Pearson's Correlation of Healthful Eating Plan with Prevention and Counseling Attitude Scores

		Attitude Score	Behavior Change Effectiveness Score	CVD Behavior Change Effectiveness Score	Importance of Prevention Counseling Score	Importance of CVD Counseling Score	Lifestyle Counseling Effectiveness Score	Smoking Cessation Counseling Score	Comfort Discussing Sensitive Topics Score
Healthful Eating Plan	Pearson Correlation	-.198**	-.192**	-.250**	-.101	-.072	-.065	-.150*	-.109
	Sig. (2-tailed)	.001	.002	.000	.101	.241	.288	.013	.074
	N	269	263	262	265	265	268	269	268
Five or More Servings of Fruits and Vegetables	Pearson Correlation	-.119	-.147*	-.196**	-.068	-.070	.012	-.066	-.028
	Sig. (2-tailed)	.050	.017	.001	.268	.258	.842	.278	.646
	N	270	264	263	266	266	269	270	269
High Fat Foods	Pearson Correlation	.027	.059	-.004	-.074	-.039	.066	.029	.074
	Sig. (2-tailed)	.662	.340	.944	.231	.530	.282	.630	.229
	N	271	265	264	267	267	270	271	270

Note. *Correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level (2-tailed

Research Question 5. *Is there a relationship between physician assistants' perceived barriers to the delivery of clinical preventive services and their prevention and counseling attitudes (perceived importance of, effectiveness of, and comfort in delivering preventive care)?*

The relationship between physician assistants' perceived barriers to the delivery of clinical preventive services and their prevention and counseling attitudes was examined using Pearson's correlation. As indicated in Table 79, there were four statistically significant relationships: barrier score and attitude score, $r(271) = -.124$, $p = .040$; barrier score and behavior change effectiveness score, $r(267) = -.125$, $p = .041$; barrier score and importance of prevention counseling score, $r(267) = -.160$, $p = .008$, and barrier score and importance of CVD counseling score, $r(267) = -.126$, $p = .039$. This suggests that as barrier scores increased, the aforementioned prevention and counseling attitude scores decreased. There was also a relationship between barrier score and CVD behavior change effectiveness score, as well as lifestyle counseling effectiveness score; however, these relationships were not statistically significant, $r(266) = -.117$, $p = .056$ and $r(270) = .108$, $p = .075$, respectively. There were no relationships between barrier score and smoking cessation or comfort discussing sensitive topics scores.

Based on the results of Research Question 5, the null hypothesis is rejected in favor of the alternative hypothesis that there is a statistically significant relationship between physician assistants' perceived barriers to the delivery of clinical preventive services and their prevention and counseling attitudes.

Table 79

Pearson's Correlation of Barrier Scores with Prevention and Counseling Attitude Scores

		Attitude Score	Behavior Change Effectiveness Score	CVD Behavior Change Effectiveness Score	Importance of Prevention Counseling Score	Importance of CVD Counseling Score	Lifestyle Counseling Effectiveness Score	Smoking Cessation Counseling Score	Comfort Discussing Sensitive Topics Score
Barrier Scores	Pearson Correlation	-.124*	-.125*	-.117	-.160**	-.126*	.108	.025	-.011
	Sig. (2-tailed)	.040	.041	.056	.008	.039	.075	.675	.855
	N	273	269	268	269	269	272	273	272

Note. *Correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level (2-tailed).

Conceptual Model

Separate stepwise multiple regression analysis from Research Questions 1, 2, and 3 found that personal health habits (regular source of care: clinician in own practice, diet: healthful eating days, and alcohol consumption: 3–4 drinks per week), prevention and counseling attitudes (behavior change effectiveness and smoking cessation counseling effectiveness), and perceived barriers to the delivery of clinical preventive services (cultural differences between providers and patients and the patient came for a different purpose) were significant factors ($p < .05$) in predicting physician assistants' preventive medicine practices. However, in order to examine the predictive model proposed in Figure 1 (see Chapter 1), physician assistants' habits, attitudes, and perceived barriers (body mass index, smoking status, exercise frequency, alcohol consumption, diet-related health habits (healthful eating days, five or more servings of fruit and vegetables, high fat foods), regular source of care, behavior change effectiveness, CVD behavior change effectiveness, importance of prevention counseling, importance of CVD prevention counseling, lifestyle counseling effectiveness, smoking cessation counseling, comfort discussing sensitive topics, lack of time, lack of health educators, insufficient reimbursement, lack of systems, personal lack of interest, lack of patient interest, uncertainty about services, lack of education materials, communication difficulties, cultural differences, and purpose of visit) were collectively entered into a stepwise multiple regression analysis. Categorical variables were dummy coded and the assumptions of linearity, independence of residuals, homoscedasticity, multicollinearity, and normality were assessed and met prior to the analysis.

Regression analysis revealed that behavior change effectiveness ($B = -2.975$), smoking cessation counseling effectiveness ($B = -3.111$), and cultural differences between providers and patients ($B = 4.304$) were the only significant factors ($p < .05$) in predicting physician assistants' preventive medicine practices. The results were statistically significant, $F(3, 245) = 81.754$, $p < .0001$, $R^2 = .500$. Therefore, from the conceptual model proposed in Figure 1 (see Chapter 1), only prevention and counseling attitudes and perceived barriers to the delivery of clinical preventive services predicted physician assistants' preventive medicine practices. Together, these factors accounted for 50% of the variance. The regression equation is:

Preventive Medicine Practices = 278.274 − 2.975 Behavior Change Effectiveness − 3.111 Smoking Cessation Counseling Effectiveness + 4.304 Cultural Differences between Providers and Patients.

The equation indicates that for every unit change in behavior change effectiveness, smoking cessation counseling effectiveness, and cultural differences between providers and patients, preventive medicine scores decreased by 2.975, decreased by 3.111, and increased by 4.304, respectively. The excluded variables due to nonsignificance ($p > .05$) were body mass index, smoking status, exercise frequency, alcohol consumption, diet-related health habits (healthful eating days, five or more servings of fruit and vegetables, high fat foods), regular source of care, CVD behavior change effectiveness, importance of prevention counseling, importance of CVD prevention counseling, lifestyle counseling effectiveness, comfort discussing sensitive topics, lack of time, lack of health educators, insufficient reimbursement, lack of systems, personal lack of interest, lack of patient interest, uncertainty about services, lack of education materials, communication

difficulties, and purpose of visit. Results of the regression analysis are presented in Table 80.

Table 80

Stepwise Multiple Regression Analysis for the Proposed Model for Predicting the Preventive Medicine Practices of Physician Assistants

Model		*B*	SE_B	β	t	Sig.
1	(Constant)	286.505	9.809		29.208	.000
	Behavior Change Effectiveness Score	-3.446	.232	-.687	-14.860	.000
2	(Constant)	294.346	10.107		29.124	.000
	Behavior Change Effectiveness Score	-3.083	.265	-.615	-11.620	.000
	Smoking Cessation Counseling Score	-2.899	1.068	-.144	-2.714	.007
3	(Constant)	278.274	11.868		23.448	.000
	Behavior Change Effectiveness Score	-2.975	.266	-.593	-11.184	.000
	Smoking Cessation Counseling Score	-3.111	1.060	-.154	-2.935	.004
	Cultural Differences Between Providers and Patients	4.304	1.712	.115	2.514	.013

Note. *B* = unstandardized regression coefficient; SE_B = standard error of the coefficient; β = standardized coefficient

Other factors that predict preventive medicine practices. Since prevention and counseling attitudes and perceived barriers to the delivery of clinical preventive services only accounted for 50% of the variance in predicting physician assistants' preventive medicine practices, and personal health habits did not to contribute to the variance, other factors such as personal and professional characteristics may also predict physician assistants' preventive medicine practices. Therefore, in order to investigate the predictive relationship between personal and professional characteristics and preventive medicine practices, gender, race/ethnicity, age, years licensed as a physician assistant, primary clinical specialty, practice region, practice environment, hours worked weekly, and number of patients seen daily were entered into a stepwise multiple regression. Categorical variables were dummy coded and the assumptions of linearity, independence of residuals, homoscedasticity, multicollinearity, and normality were assessed and met prior to the analysis.

Regression analysis revealed that surgical subspecialties ($B = -62.194$), other subspecialties ($B = -49.971$), emergency medicine ($B = -45.368$), internal medicine subspecialties ($B = -32.766$), more than 30 patients seen daily ($B = 22.046$), and other practice environment ($B = -22.897$) were the only significant personal and professional characteristics ($p < .05$) in predicting physician assistants' preventive medicine practices. The results were statistically significant, $F(6, 261) = 19.036$, $p < .0001$, $R^2 = .304$. Therefore, personal and professional characteristics, specifically primary clinical specialty, the number of patients seen daily, and practice environment accounted for 30% of the explained variability in predicting physician assistants' preventive medicine practices. The regression equation is:

Preventive Medicine Practices = 173.958 − 62.194 Surgical Subspecialties − 49.971 Other Subspecialties − 45.368 Emergency Medicine − 32.766 Internal Medicine Subspecialties + 22.046 More than 30 Patients Seen Daily − 22.897 Other Practice Setting.

The equation indicates that in order to predict physician assistants' preventive medicine practices from their personal and professional characteristics, 62.194 points would be subtracted from their behavior score (lower scores represent less preventive medicine practices) if they practiced in surgical subspecialties; 49.971 points would be subtracted if they practiced in other subspecialties, 45.368 points would be subtracted if they practiced emergency medicine, 32.766 points would be subtracted if they practiced in internal medicine subspecialties, 22.046 points would be added if they saw more than 30 patients per day, and 22.897 points would be subtracted if they practiced in settings other than a hospital, physician group or solo practice, community health center, or certified rural health clinic. The excluded variables due to nonsignificance ($p > .05$) were gender, race/ethnicity, age, years licensed as a physician assistant, practice region, and hours worked weekly. Results of the regression analysis are presented in Table 81.

Table 81

Stepwise Multiple Regression Analysis for Personal and Professional Characteristics Predicting Preventive Medicine Practices

Model		*B*	SE_B	β	t	Sig.
1	(Constant)	153.246	3.215		47.669	.000
	Surg_Sub	-40.139	6.528	-.353	-6.149	.000
2	(Constant)	161.177	3.501		46.036	.000
	Surg_Sub	-48.070	6.485	-.422	-7.413	.000
	Other_Sub	-35.777	7.436	-.274	-4.811	.000
3	(Constant)	165.746	3.669		45.173	.000
	Surg_Sub	-52.639	6.484	-.463	-8.118	.000
	Other_Sub	-40.346	7.399	-.309	-5.453	.000
	EmMed	-36.096	10.313	-.195	-3.500	.001
4	(Constant)	174.320	4.124		42.274	.000
	Surg_Sub	-61.213	6.629	-.538	-9.234	.000
	Other_Sub	-48.920	7.478	-.375	-6.542	.000
	EmMed	-44.670	10.226	-.241	-4.368	.000
	IM_Sub	-33.806	8.188	-.234	-4.129	.000

(table continues)

Model		*B*	SE_B	β	t	Sig.
	(Constant)	172.241	4.178		41.231	.000
	Surg_Sub	-60.781	6.573	-.534	-9.248	.000
	Other_Sub	-49.697	7.418	-.381	-6.699	.000
5	EmMed	-44.733	10.135	-.241	-4.414	.000
	IM_Sub	-32.338	8.138	-.223	-3.974	.00
	Pts30_	21.421	8.921	.125	2.401	.017
	(Constant)	173.958	4.233		41.097	.000
	Surg_Sub	-62.194	6.567	-.547	-9.471	.000
	Other_Sub	-49.971	7.373	-.383	-6.777	.000
6	EmMed	-45.368	10.076	-.244	-4.503	.000
	IM_Sub	-32.766	8.089	-.226	-4.050	.000
	Pts30_	22.046	8.870	.129	2.485	.014
	Other_Prac	-22.897	11.022	-.108	-2.077	.039

Note. *B* = unstandardized regression coefficient; SE_B = standard error of the coefficient; β = standardized coefficient

Improved model for predicting physician assistants' preventive medicine practices. Previous regression analysis found that prevention and counseling attitudes (behavior change effectiveness and smoking cessation counseling effectiveness), perceived barriers to the delivery of clinical preventive services (cultural differences between providers and patients), and personal and professional characteristics (surgical subspecialties, other subspecialties, emergency medicine, internal medicine subspecialties, more than 30 patients seen daily, and other practice environment) were significant ($p < .05$) in predicting physician assistants' preventive medicine practices. However, in order to gain a more realistic understanding of the predictive relationship between physician assistants' habits, attitudes, barriers, characteristics, and their preventive medicine practices; gender, race/ethnicity, age, years licensed as a physician assistant, primary clinical specialty, practice region, practice environment, hours worked weekly, number of patients seen daily, body mass index, smoking status, exercise frequency, alcohol consumption, diet-related health habits (healthful eating days, five or more servings of fruit and vegetables, high fat foods), regular source of care, behavior change effectiveness, CVD behavior change effectiveness, importance of prevention counseling, importance of CVD prevention counseling, lifestyle counseling effectiveness, smoking cessation counseling, comfort discussing sensitive topics, lack of time, lack of health educators, insufficient reimbursement, lack of systems, personal lack of interest, lack of patient interest, uncertainty about services, lack of education materials, communication difficulties, cultural differences, and purpose of visit were entered into a stepwise multiple regression. Categorical variables were dummy coded and the

assumptions of linearity, independence of residuals, homoscedasticity, multicollinearity, and normality were assessed and met prior to the analysis.

Regression analysis revealed that behavior change effectiveness ($B = -2.571$), community health center ($B = 18.604$), smoking cessation counseling effectiveness ($B = -3.318$), surgical subspecialties ($B = -28.263$), other subspecialties ($B = -23.032$), cultural differences between providers and patients ($B = 4.298$), other practice environment ($B = -26.365$), emergency medicine ($B = -16.952$), and personal lack of interest in providing preventive medicine services ($B = 3.159$) were the only significant factors ($p < .05$) in predicting physician assistants' preventive medicine practices. Results were statistically significant, $F(9, 233) = 43.215$, $p < .0001$, $R^2 = .625$.

Therefore, adding personal and professional characteristics to the regression model found that prevention and counseling attitudes, perceived barriers to the delivery of clinical preventive services, and personal and professional characteristics accounted for 63% of the variance in predicting physician assistants' preventive medicine practices, ($p > .05$). Personal health habits were still not significant ($p > .05$) in the model. The regression equation is:

Preventive Medicine Practices = 267.094 − 2.571 Behavior Change Effectiveness + 18.604 Community Health Center − 3.318 Smoking Cessation Counseling − 28.263 Surgical Subspecialties − 23.032 Other Subspecialties + 4.298 Cultural Difference between Providers and Patients − 26.365 Other Practice Setting − 16.952 Emergency Medicine + 3.159 Personal Lack of Interest in Providing Preventive Medicine Services.

The equation indicates that in order to predict physician assistants' preventive medicine practices from their prevention and counseling attitudes, perceived barriers to the delivery of clinical preventive services, and personal and professional characteristics, 2.571 points would be subtracted from their behavior score (lower scores represent less preventive medicine practices) for every unit change in behavior change effectiveness; 18.604 points would be added if they practiced in a community health center, 3.318 points would be subtracted for every unit change in smoking cessation counseling effectiveness, 28.263 points would be subtracted if they practiced in surgical subspecialties, 23.032 points would be subtracted if they practiced in other subspecialties, 4.298 points would be added for every unit change in cultural differences between providers and patients, 26.365 points would be subtracted if they practiced in settings other than a hospital, physician group or solo practice, community health center, or certified rural health clinic; 16.952 points would be subtracted if they practiced emergency medicine, and 3.159 points would be added for every unit change in personal lack of interest in providing preventive medicine services. The excluded variables due to nonsignificance ($p > .05$) were gender, race/ethnicity, age, years licensed as a physician assistant, practice region, hours worked weekly, number of patients seen daily, body mass index, smoking status, exercise frequency, alcohol consumption, diet-related health habits (healthful eating days, five or more servings of fruit and vegetables, high fat foods), regular source of care, CVD behavior change effectiveness, importance of prevention counseling, importance of CVD prevention counseling, lifestyle counseling effectiveness, comfort discussing sensitive topics, lack of time, lack of health educators, insufficient reimbursement, lack of systems, lack of patient interest, uncertainty about services, lack of education materials,

communication difficulties, and purpose of visit. Results of the regression analysis are presented in Table 82. The new conceptual model for predicting physician assistants' preventive medicine practices is illustrated in Figure 5.

Table 82

Stepwise Multiple Regression Analysis for the Improved Model for Predicting Physician Assistants' Preventive Medicine Practices

Model		*B*	SE_B	β	t	Sig.
1	(Constant)	291.909	9.822		29.720	.000
	Behavior Change Effectiveness Score	-3.561	.232	-.704	-15.376	.000
2	(Constant)	283.680	9.648		29.402	.000
	Behavior Change Effectiveness Score	-3.445	.225	-.681	-15.331	.000
	ComHlthCntr	28.948	6.563	.196	4.410	.000
3	(Constant)	290.970	9.832		29.594	.000
	Behavior Change Effectiveness Score	-3.060	.258	-.605	-11.850	.000
	ComHlthCntr	30.543	6.488	.207	4.707	.000
	Smoking Cessation Counseling Score	-2.968	1.026	-.147	-2.893	.004
4	(Constant)	287.700	9.736		29.549	.000
	Behavior Change Effectiveness Score	-2.803	.268	-.554	-10.442	.000
	ComHlthCntr	27.271	6.478	.185	4.210	.000
	Smoking Cessation Counseling Score	-3.386	1.019	-.167	-3.322	.001
	Surg_Sub	-15.453	5.191	-.137	-2.977	.003
5	(Constant)	288.432	9.560		30.171	.000
	Behavior Change Effectiveness Score	-2.690	.266	-.532	-10.114	.000
	ComHlthCntr	23.365	6.478	.158	3.607	.000
	Smoking Cessation Counseling Score	-3.456	1.001	-.171	-3.453	.001
	Surg_Sub	-20.912	5.380	-.186	-3.887	.000
	Other_Sub	-17.947	5.673	-.142	-3.164	.002

(table continues)

Model		B	SE_B	β	t	Sig.
6	(Constant)	268.464	11.148		24.082	.000
	Behavior Change Effectiveness Score	-2.518	.266	-.498	-9.478	.000
	ComHlthCntr	22.472	6.352	.152	3.538	.000
	Smoking Cessation Counseling Score	-3.762	.985	-.186	-3.820	.000
	Surg_Sub	-22.914	5.305	-.204	-4.319	.000
	Other_Sub	-19.992	5.592	-.158	-3.575	.000
	Cultural Differences Between Providers and Patients	5.235	1.585	.139	3.303	.001
7	(Constant)	271.235	11.099		24.438	.000
	Behavior Change Effectiveness Score	-2.614	.266	-.517	-9.823	.000
	ComHlthCntr	20.597	6.338	.139	3.250	.001
	Smoking Cessation Counseling Score	-3.467	.983	-.171	-3.526	.001
	Surg_Sub	-23.639	5.262	-.210	-4.493	.000
	Other_Sub	-20.428	5.540	-.161	-3.687	.000
	Cultural Differences Between Providers and Patients	5.375	1.570	.143	3.422	.001
	Other_Prac	-22.065	9.231	-.100	-2.390	.018
8	(Constant)	271.991	11.015		24.694	.000
	Behavior Change Effectiveness Score	-2.618	.264	-.517	-9.920	.000
	ComHlthCntr	17.779	6.416	.120	2.771	.006
	Smoking Cessation Counseling Score	-3.096	.990	-.153	-3.128	.002
	Surg_Sub	-26.541	5.383	-.236	-4.930	.000
	Other_Sub	-23.247	5.643	-.183	-4.120	.000
	Cultural Differences Between Providers and Patients	5.180	1.560	.138	3.320	.001
	Other_Prac	-22.956	9.166	-.104	-2.505	.013
	EmMed	-17.026	7.735	-.095	-2.201	.029

(table continues)

Model		B	SE_B	β	t	Sig.
9	(Constant)	267.094	11.191		23.867	.000
	Behavior Change Effectiveness Score	-2.571	.263	-.508	-9.773	.000
	ComHlthCntr	18.604	6.384	.126	2.914	.004
	Smoking Cessation Counseling Score	-3.318	.989	-.164	-3.357	.001
	Surg_Sub	-28.263	5.410	-.251	-5.224	.000
	Other_Sub	-23.032	5.605	-.182	-4.110	.000
	Cultural Differences Between Providers and Patients	4.298	1.607	.114	2.675	.008
	Other_Prac	-26.365	9.250	-.119	-2.850	.005
	EmMed	-16.952	7.681	-.095	-2.207	.028
	Personal Lack of Interest in Providing Preventive Services	3.159	1.526	.090	2.070	.040

Note. B = unstandardized regression coefficient; SE_B = standard error of the coefficient; β = standardized coefficient.

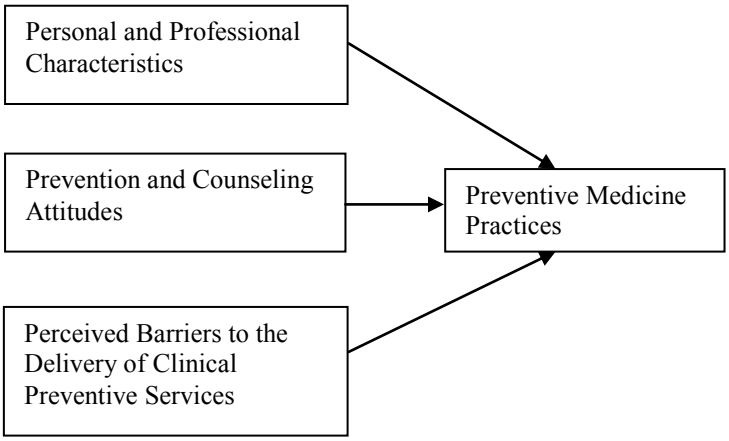

Figure 5. Improved model for predicting physician assistants' preventive medicine practices.

Summary

Physician assistants play a key role in expanding access to health care, including health promotion and disease prevention services. Despite the history of the profession, research on the preventive medicine practices of physician assistants is virtually nonexistent. Therefore, to address a crucial research need and better understand these health care providers, this study examined the relationship between their preventive medicine practices, health habits, attitudes, beliefs, and personal and professional characteristics.

Descriptive and inferential statistical analyses were performed on the responses of a 104-item questionnaire administered to physician assistants attending the AAPA 42nd Annual Conference. The questionnaire collected information on 11 personal and professional characteristics, 9 personal health habits, 37 preventive medicine behaviors, 36 prevention and counseling attitudes, and 11 perceived barriers to the delivery of clinical preventive services. Frequency distribution was used to provide a descriptive overview of the study participants, and chi-square (X^2) analysis was used to provide probabilities of each characteristic based on the frequency of variables. Measures of central tendency and dispersion were used to describe scale items measuring preventive medicine practices, prevention and counseling attitudes, and perceived barriers, and their corresponding summative scores. One-way ANOVA and independent-samples *t* test were performed to examine physician assistants' personal and professional characteristics on reported levels of preventive medicine practices, prevention and counseling attitudes, and perceived barriers. Pearson's and Spearman's correlations were calculated to address the research questions and test the hypotheses that drove the study. Lastly, regression

analysis—simple linear and stepwise multiple—was used to investigate the predictive relationships between physician assistants' preventive medicine practices and their personal health habits, prevention and counseling attitudes, perceived barriers to the delivery of clinical preventive services, and personal and professional characteristics.

Results showed that in general, physician assistants employed preventive medicine practices, overall prevention, primary prevention, and CVD prevention about half the time (41–60%); asked about harmful activities about half the time (41–60%) and substance use often (61–80%); encouraged cancer screening and promoted smoking cessation some of the time (21–40%), and provided hypertension management about half the time (41–60%). Additionally, they believed they were *somewhat effective* in changing overall and CVD behaviors; *moderately effective* at smoking cessation counseling, and *moderately comfortable* discussing sensitive topics. They believed it was *very important* for them to counsel patients on health promotion and disease prevention and CVD-related issues, but felt they were *somewhat less effective* at lifestyle counseling. Furthermore, they believed barriers to the delivery of clinical preventive services exist, and that the barriers were *somewhat important* in hindering them from providing effective health promotion and disease prevention to their patients.

There were no statistically significant differences in preventive medicine practices scores by gender, race/ethnicity (except for overall prevention behavior and harmful activities), age, years licensed, region (except for substance use), hours worked, and number of patients seen (except for hypertension management). There was a statistical difference by primary clinical specialty and practice environment. Additionally, there were no statistically significant differences in prevention and counseling attitude scores

by gender (except for lifestyle counseling effectiveness and smoking cessation), age, years licensed (except for importance of CVD counseling), region (except for importance of prevention counseling and importance of CVD counseling), hours worked, and number of patients seen (except for behavior change effectiveness and comfort discussing sensitive topics). There was a statistical difference by race/ethnicity (for attitude, behavior change effectiveness, and CVD behavior change effectiveness), primary clinical specialty (except for importance of prevention counseling) and practice environment (except for importance of prevention counseling and importance of CVD counseling). Lastly, there were no statistically significant differences in perceived barriers to the delivery of clinical preventive services scores by gender, age, years licensed, primary clinical specialty, region, practice environment, hours worked, and number of patients seen. There was however, a statistically significant difference by race/ethnicity.

The null hypothesis for Research Question 1 was rejected. Hypothesis testing found that there was a statistically significant relationship between healthful eating plan and behavior score, overall prevention behavior score, primary prevention score, CVD prevention score, harmful activities score, and substance use score. Additionally, there was a statistically significant relationship between alcohol consumption and cancer screening score. The results also suggest that there was a relationship between BMI and overall prevention behavior score, physical activity and CVD prevention score, physical activity and smoking cessation score, healthful eating plan and smoking cessation score, healthful eating plan and hypertension management score, and regular source of care and smoking cessation score; however, none of these relationships were statistically significant. There were no relationships with tobacco use.

Stepwise multiple regression analysis was conducted to assess the predictive relationship between personal health habits and preventive medicine practices. Personal health habits accounted for 6% of the explained variability in predicting physician assistants' preventive medicine practices. Results were statistically significant ($p < .05$).

The null hypothesis for Research Question 2 was rejected. Hypothesis testing found that of the 72 relationships analyzed, 68 were statistically significant; one was not statistically significant, and three did not have any relation. Of the 68 that were statistically significant, importance of prevention counseling score and CVD prevention score, importance of prevention counseling score and hypertension management score, importance of CVD prevention counseling score and harmful activities score, and lifestyle counseling effectiveness score, were significant at the .05 level (2-tailed); the rest were significant at the .01 level (2-tailed). Although not statistically significant, there was a relationship between importance of prevention counseling score and substance use score. There were no relationships between importance of prevention counseling score and smoking cessation score, importance of CVD prevention counseling score and smoking cessation score, or importance of CVD prevention counseling score and substance use score.

Stepwise multiple regression analysis was conducted to assess the predictive relationship between prevention and counseling attitudes and preventive medicine practices. Prevention and counseling attitudes score accounted for 51% of the explained variability in predicting physician assistants' preventive medicine practices. Results were statistically significant ($p < .05$).

The null hypothesis for Research Question 3 was rejected. Hypothesis testing found that there was a statistically significant relationship between barrier score and behavior score, overall prevention behavior score, primary prevention score, CVD prevention score, smoking cessation score, and hypertension management score. There were no relationships between barrier score and harmful activity, substance use, or cancer screening scores.

Stepwise multiple regression analysis was conducted to assess the predictive relationship between perceived barriers to the delivery of clinical preventive services and preventive medicine practices. Perceived barriers scores accounted for approximately 6% of the explained variability in predicting physician assistants' preventive medicine practices. Results were statistically significant ($p < .05$).

The null hypothesis for Research Question 4 was rejected. Hypothesis testing found that there was a statistically significant relationship between BMI and importance of prevention counseling score; exercise status and behavior change effectiveness score, exercise status and CVD behavior change effectiveness score; healthful eating plan and attitude score, behavior change effectiveness score, CVD behavior change effectiveness score, and smoking cessation score; eating five plus servings of fruits and vegetables and behavior change effectiveness score and CVD behavior change effectiveness score. The results also suggest that there was a relationship between exercise and attitude score, alcohol consumption and importance of CVD prevention counseling score, healthful eating plan and importance of prevention counseling score, healthful eating plan and comfort discussing sensitive topics score, and five plus servings of fruits and vegetables and attitude score; however, none of these relationships were statistically significant.

There were no relationships between tobacco use or RSOC and any prevention and counseling attitude scores.

The null hypothesis for Research Question 5 was rejected. Hypothesis testing found that there was a statistically significant relationship between barrier score and attitude score, behavior change effectiveness score, importance of prevention counseling score, and importance of CVD counseling score. There was also a relationship between barrier score and CVD behavior change effectiveness score, as well as lifestyle counseling effectiveness score; however, these relationships were not statistically significant. There were no relationships between barrier score and smoking cessation or comfort discussing sensitive topics scores.

In order to examine the predictive model proposed in Figure 1 (see Chapter 1), physician assistants' personal health habits, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services were collectively entered into a stepwise multiple regression analysis. Only attitudes and barriers predicted physician assistants' preventive medicine practices. Together, these factors accounted for 50% of the explained variability. Results were statistically significant ($p < .05$).

Since 50% of the variance in predicting physician assistants' preventive medicine practices was unexplained, other factors such as personal and professional characteristics were thought to also predict preventive medicine practices. Therefore, an investigative stepwise multiple regression analysis was conducted. Personal and professional characteristics were found to account for 30% of the explained variability in predicting physician assistants' preventive medicine practices. Results were statistically significant ($p < .05$).

Because personal and professional characteristics explained some of the variance in predicting physician assistants' preventive medicine practices, a final investigative stepwise multiple regression analysis was conducted in order to gain a more realistic understanding of the predictive relationship between physician assistants' habits, attitudes, barriers, and characteristics. Prevention and counseling attitudes, perceived barriers to the delivery of clinical preventive regression analysis, and personal and professional characteristics accounted for 63% of the explained variability in predicting physician assistants' preventive medicine practices. Results were statistically significant ($p < .05$). Personal health habits were still not significant ($p > .05$) in the model.

In the original model proposed in Figure 1 (see Chapter 1), three variables (behavior change effectiveness, smoking cessation counseling, and cultural differences between providers and patients) accounted for 50% of the explained variability in predicting physician assistants' preventive medicine practices. However, with personal and professional characteristics added to the model, nine variables (behavior change effectiveness, community health center, smoking cessation counseling, surgical subspecialties, other subspecialties, cultural differences between providers and patients, other practice environment, emergency medicine, and personal lack of interest in providing preventive medicine services) accounted for 63% of the explained variability in predicting physician assistants' preventive medicine practices.

Chapter 5 provides a more detailed discussion and interpretation of the study findings. The chapter also includes study limitations, recommendations for practice and future research. The chapter concludes with social change implications.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

Chapter 5 summarizes key findings and provides an interpretation of the results presented in Chapter 4. In addition, the study's limitations are reviewed and evaluated. The chapter concludes with recommendations for future research and a discussion on the social change implications of this study's research findings.

The purpose of this study was to investigate the relationship between physician assistants' preventive medicine practices, personal health habits, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services. A secondary objective was to predict physician assistants' counseling practices.

Although physician assistants have practiced medicine in the United States for over 45 years, little is known about their health habits, attitudes, beliefs, and counseling practices. Conversely, there is no known research on the relationship between these variables. Therefore, because the number of physician assistants in health care practice is projected to grow 38% over the next 10 years (BoLS, 2012), it was important to conduct this study, not only because it highlights their health habits, attitudes, perceived barriers, and preventive medicine practices, but because it also addresses a sizable gap in literature.

Summary of Findings

Using a cross-sectional survey, this study gathered data from 314 physician assistants attending the 42nd annual AAPA conference, and was navigated by five research questions. Results revealed 78.3% of the respondents had a regular source of

care; the average physician assistant was slightly overweight (M_{BMI} = 26.22 kg/m^2); 42% followed a healthful eating plan at least five days a week; 35% ate five or more servings of fruits and vegetables on five or more days; 80.5% ate high-fat foods on four or fewer days per week; 58.9% exercised at least three times per week; 86.3% reported no history of tobacco use, and 62.1% consumed 1-4 alcoholic beverages per week. Additionally, they employed preventive medicine practices 41–60% of the time; believed they were *somewhat effective* in changing overall behaviors; *moderately effective* at smoking cessation counseling, and *moderately comfortable* discussing sensitive topics. They believed it was *very important* to counsel patients on health promotion and disease prevention issues, but felt *somewhat effective* at lifestyle counseling. Furthermore, they believed barriers to the delivery of clinical preventive services exist, and that the barriers were *somewhat important* in hindering them from providing effective health promotion and disease prevention to their patients.

Hypothesis testing revealed statistically significant relationships between personal health habits and preventive medicine practices; prevention and counseling attitudes and preventive medicine practices; perceived barriers to the delivery of clinical preventive services and preventive medicine practices; personal health habits and prevention and counseling attitudes, as well as perceived barriers to the delivery of clinical preventive services and prevention and counseling attitudes. Therefore the null hypothesis for each research question was rejected in favor of the alternative hypothesis.

Separate stepwise multiple regression analyses found that personal health habits, prevention and counseling attitudes, and perceived barriers to the delivery of clinical

preventive services were significant predictors of physician assistants' preventive medicine practices, ($p < .05$). However, examination of the predictive model proposed in Figure 1 (see Chapter 1), found that only prevention and counseling attitudes (behavior change effectiveness and smoking cessation counseling effectiveness) and perceived barriers to the delivery of clinical preventive services (cultural differences between providers and patients) accounted for the 50% variance in predicting physician assistants' preventive medicine practices. An investigative stepwise multiple regression analysis also found that personal and professional characteristics accounted for 30% of the variability in predicting physician assistants' preventive medicine practices.

By adding personal and professional characteristics to the originally proposed model, regression analysis revealed prevention and counseling attitudes (behavior change effectiveness and smoking cessation counseling effectiveness), perceived barriers to the delivery of clinical preventive services (cultural differences between providers and patients and personal lack of interest in providing preventive medicine services), primary clinical specialty (surgical subspecialties, other subspecialties, and emergency medicine), and practice environment (community health center and other practice environment) accounted for 63% of the explained variability in predicting physician assistants' preventive medicine practices.

Interpretation of the Findings

In order to answer the five research questions that drove this study, physician assistants' self-reported health habits, prevention and counseling attitudes, perceived barriers to the delivery of clinical preventive services, and preventive medicine practices

were assessed. Limited research to date has explored these variables in physician assistant populations. Therefore, because physician assistants are trained in a model that closely resembles that which is taught in medical school and are licensed to work under the auspices of a physician (AAPA, 2011a; PA Focus, 2014), comparisons can be made using the knowledge of the physician population. Likewise, due to the similar practicing nature of nurse practitioners, literature on their preventive care practices can also be used.

Self-Reported Personal Health Habits

Confidence in the ability to counsel patients on healthy lifestyle choices may be related to personal health habits. Clinicians who live healthier lifestyles experience better personal health, send believable messages to their patients, and provide improved patient care (Howe et al., 2010). Additionally, practicing healthy behaviors has been shown to be the most consistent and powerful predictor of health promotion and disease prevention counseling by physicians (Shahar et al., 2009). Since there is no published research to date on the self-reported personal health habits of physician assistants, the results of this study may contribute to further research and discussion on the topic, as well as assessment tools that promote continuous improvement in physician assistant training programs and personal development strategies.

The majority of physician assistants in this study reported having a regular source of care, suggesting they value continuity in their care and understand its importance in the facilitation of appropriate and timely medical services. Research has shown health care providers with a regular source of care are not only healthier, but also utilize health

promotion and disease prevention strategies in their practice of medicine (Gross et al., 2000).

The current study also found that the average physician assistant was slightly overweight ($M = 26.22$ kg/m^2). In comparison, Hung, Keenan, and Fang (2013) found that primary care physicians who completed a web-based survey on their health habits, attitudes, and practice behaviors regarding the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC VII) lifestyle modification guidelines were slightly overweight ($M = 25.6$ kg/m^2). Hung et al. (2013) also found that less than half of the respondents were of normal weight. Because research has indicated that provider BMI and weightloss efforts are direct predictors of their weight management and counseling practices (Bleich, Bennett, Gudzune, & Cooper, 2012; Hash et al., 2002; Howe, et al., 2010; Kosteva et al., 2012), these findings suggest that overweight physician assistants may not be counseling their patients on weight management issues.

Despite the benefits of a healthy diet and weekly exercise regimen, Howe et al. (2010) found that physicians in training and attending physicians reported low levels of fruit and vegetable consumption and physical activity. Similarly, less than half of the physician assistants in this study followed a healthy eating plan at least five days a week; only a third consumed five or more servings of fruits and vegetables on five or more days per week, and slightly more than half exercised at least three times per week. These findings suggest there is room for improvement, as most physician assistants are not meeting the national recommendations for diet and exercise. Furthermore, research

indicates nutrition and weight-related issues important in the personal lives of clinicians reflect in their professional work with patients (Frank et al., 2002). Likewise, clinicians who report relatively healthy diets and diet-related habits are more likely to counsel their patients than those who do not adhere to such behaviors (Frank et al., 2002). These findings suggest that some physician assistants may not counsel their patients on diet and weight-related issues. In addition, clinicians who engage in aerobic exercise and/or strength training on a frequent basis are more likely to counsel their patients on the benefits of exercise for a healthier lifestyle (Abramson, et al., 2000). As such, findings from this study imply that exercise counseling delivered by physician assistants may be low.

The percentage of physician assistants who smoked was relatively low (< 1%) and most (86%) had never smoked. These findings are parallel to a study by the Association of American Medical Colleges (2007) which found that 76% of physicians never smoked and only 1% were current smokers. Although the current study found a greater percentage of physician assistants who had never smoked, findings indicate that physician assistants are much like physicians in regards to smoking status. Furthermore, results imply that physician assistants not only deem tobacco use as detrimental to their health, but also believe they are exemplars and as such, may well consider smoking an occupational health issue. Moreover, because it has been documented that smoking status influences to what extent physicians inquire about tobacco use and advise cessation (Frank et al., 2010; Pipe et al., 2009), findings also suggest that physician assistants may inquire about tobacco use and advise smoking cessation at fairly high rates. This notion

has been supported by Pipe et al. (2009) who found that compared to nonsmoking physicians, physicians who smoked were less likely to inquire about tobacco use or advise smoking cessation. Likewise, Hung et al. (2013) found that nonsmoking physicians were 2.6 times more likely to advise hypertensive patients on all five JNC VII recommendations.

Excessive alcohol consumption has been linked to considerable morbidity, accidents, violence, and social and legal issues (Enoch & Goldman, 2002). Although there are published studies on the alcohol consumption of physicians, very few have linked alcohol consumption to alcohol counseling practices and none have evaluated the alcohol consumption of physician assistants. The current study found that 7% of physician assistants consumed five or more drinks per week, 23% consumed 3–4 drinks per week, and 28% did not drink at all. In a published study of randomly selected members and fellows of the American College of Physicians, Lewis et al. (1991) found that 11% drank daily, 27% consumed alcohol several times per week, 13.3% were nondrinkers, and 7.2% believed they drank too much. The study also demonstrated that internists who drank still counseled their patients on the ill effects of alcohol consumption (Lewis et al., 1991). Although this study found a higher number of nondrinkers, findings indicate that physician assistants are much like physicians in regards to alcohol consumption. As such, it is implied that despite the level of alcohol consumption, physician assistants will counsel their patients on the ill effects of alcohol consumption. However, empirical research is needed to confirm or dispel this assumption in physician assistant populations.

Prevention and Counseling Attitudes

Motivation to counsel patients on healthy lifestyle choices may be moderated by prevention and counseling attitudes. Health care providers who have positive attitudes toward prevention and counseling and believe they are effective at modifying patient behavior are most successful in incorporating health promotion and disease prevention strategies in their practice of medicine (Dunn et al., 2009; Howe et al., 2010; Laws et al., 2009). Because there is little research on the prevention and counseling attitudes of physician assistants, results from this study may lead to further research and discussion on the topic, as well as educational opportunities for personal development.

This study revealed that physician assistants believed it was *very important* to counsel patients on health promotion and disease prevention. Although they held this belief, they were only *somewhat comfortable* counseling about HIV/AIDS, felt *somewhat effective* in changing patients' behavior, and *somewhat believed* patients try to change their lifestyles based on their advice. Furthermore, they remained neutral on their beliefs regarding health education being able to promote patient adherence to a healthy lifestyle, being less effective than professional counselors in getting patients to quit smoking, and the notion that asymptomatic patients rarely changed their behavior on the basis of their advice. They did hold positive beliefs however, about smoking cessation as an effective use of their time, and being comfortable discussing illegal drug use, sexual behavior, and asking patients about their sexual orientation.

According to Fincher-Mergi et al. (2002), 45% of health care providers (medical doctors, physician assistants, nurse practitioners, and registered nurses) in an emergency

department felt uncomfortable about counseling patients on HIV/AIDS due to the lack of training and certification. Additionally, researchers found that approximately half of the providers *usually* or *always* warned patients about their HIV risk (Fincher-Mergi et al., 2002). This study found similar results—physician assistants reported only being *somewhat comfortable* counseling patients in this area. Respondents in the current study were comfortable discussing sexual behavior and asking about sexual orientation; however this finding was not supported by the literature. Lewis and Freeman (1987) found that a major deterrent to physicians—especially males—asking about sexual behavior and orientation was the discomfort of "dealing with" gay men (p. 166). More recently, Petroll and Mosack (2011) found that 73% to 82% of physicians felt comfortable treating homosexuals, but only 14% initiated the conversation about their sexual orientation.

In a study by Kushner (1995), it was found that 75% of physicians felt it was not only important to counsel patients on nutrition, but that it was their responsibility as a clinician. Conversely, a study on physical activity found that 22% of physician assistants felt that counseling on physical activity was useless because of the lack of adherence by patients (Grimstvedt et al., 2012). These findings suggest that the majority of physicians assistants felt physical activity counseling was important. Results from the current study mirrored these results and suggest that although physician assistants believe it is important to counsel patients on diet and exercise, some feel their efforts are fruitless because of the lack of patient adherence to their recommendations. Holding these feelings may impact preventive care delivery.

The current study found that while physician assistants saw smoking cessation as an effective use of their time, they remained neutral about being less effective than professional counselors in getting patients to quit smoking. Although echoed by Weaver et al. (2012) who found that only 18% of physicians and nonphysician providers felt confident in their abilities to counsel smoking patients, Caplan, Stout, and Blumenthal (2011) found that patients who received physician advice to quit smoking were 1.6 times more likely to do so as compared to those who did not receive such advice. This suggests that physician assistants' beliefs about their effectiveness might be misguided, as they too may be effective in getting patients to quit.

Perceived Barriers to the Delivery of Clinical Preventive Services

Perceived barriers to the delivery of clinical preventive services may hinder assurance in the ability to counsel patients on healthy lifestyle choices. Although practitioners believe they are responsible for promoting healthy behavior and counseling patients about lifestyle modification (Kolasa & Rickett, 2010; Delnevo et al., 2003; Ma et al., 2004), they often cite barriers to preventive medicine delivery, including lack of time, insufficient reimbursement, low patient interest, uncertainty about what preventive services to provide, lack of self-confidence, and inadequate training (Carlson et al., 2009; Oscós-Sánchez et al., 2008; Pool et al., 2013; Warren et al., 2013; Woolf, 2008). Since there are no published studies on physician assistants' perceived barriers to the provision of preventive care, results from this study may lead to further research and discussion on the topic, as well as educational training opportunities and policy changes that address system constraints.

Physician assistants believed barriers to the delivery of clinical preventive services exist and that collectively, these barriers were *somewhat important* in hindering them from providing effective health promotion and disease prevention. Lack of time was cited as being *moderately important*, whereas uncertainty about what services to provide and personal lack of interest in providing preventive services were cited as being *minimally important*. Cultural differences between patients and providers, communication difficulties with patients, lack of proper educational materials, insufficient reimbursement, lack of tracking systems, lack of patient interest, lack of available health educators, and the patient came in for a different purpose were all found to be *somewhat important*. These findings suggest physician assistants have a personal interest in providing preventive care to their patients and are aware of the recommended services. Additionally, findings indicate that although other barriers exist, lack of time is viewed as the main barrier to delivering effective health promotion and disease prevention. These findings are supported by previous research (Arbelaez et al., 2012; Caplan et al., 2011; Geller et al., 2004; Gottlieb, Guo, Blozis, & Huang, 2001; Grimstvedt et al., 2012; Kolasa & Rickett, 2010; Warren et al., 2013).

Preventive Medicine Practices

The delivery of clinical preventive care can mitigate many causes of morbidity and mortality. As front-line providers, physician assistants are in a unique position to deliver this care. Although practitioners believe they are responsible for promoting healthy behavior and counseling patients about lifestyle modification (Kolasa & Rickett, 2010), research indicates they provide such services at low rates (Gelly et al., 2013;

Shires et al., 2012; Yeazel, et al., 2006). Given the limited research on the preventive medicine practices of physician assistants, findings from this study may encourage further investigation and discussion on the topic, as well as curriculum changes in physician assistant training programs and professional development opportunities during annual conferences.

Findings revealed that physician assistants delivered overall prevention, primary prevention, and CVD prevention 41–60% of the time; asked about harmful activities 41–60% of the time and substance use 61–80% of the time; encouraged cancer screening and used collective smoking cessation strategies 21–40% of the time, and provided hypertension management 41–60% of the time. Collectively, preventive medicine practices were delivered 41–60% of the time. Although there is speculation that physician assistants provide more prevention-oriented care than physicians (Cawley, 2012; Reed & Selleck, 1996), these results indicate that preventive care delivered by physician assistants is somewhat low. Considering the current study's findings regarding physician assistants' self-reported health habits, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services, these findings are not surprising.

Despite believing exercise, healthy diet, and weight reduction were *very important*, physician assistants' preventive medicine practices in these areas were low. This suggests that other factors, such as behavior change effectiveness, personal health habits, and perceived barriers play a role in their counseling practices. This postulation is supported by the current study's findings, which demonstrated that physician assistants not only reported having some poor health habits, but also reported feeling only

somewhat effective in changing patients' diet, exercise, and weight reduction behaviors. Additionally, many of the respondents felt that *lack of time* was the main barrier to the delivery of effective health promotion and disease prevention. These findings are consistent with current literature (Arbelaez et al., 2012; Caplan et al., 2011; Grimstvedt et al., 2012; Kolasa & Rickett, 2010; Warren et al., 2013) which suggests that health care providers as a whole feel constrained by time.

When physician assistants saw overweight patients, they incorporated prevention strategies 41–60% of the time. Despite being slightly overweight themselves, they did encouraged patients 61–80% of the time to exercise regularly. These findings are consistent with published research and the internal findings of this study. For instance, Grimstvedt et al. (2012) found that 64% of physician assistants routinely counseled patients about regular physical activity. Likewise, in another study using three PMAAQ scales—CVD prevention behavior, CVD prevention counseling, and barriers to provision of preventive services—Passey, Fanaian, Lyle, and Harris (2010) found that 91% of physicians *always*, *usually*, or *often* encouraged overweight patients to exercise regularly. Although the present study found that the average physician assistant was slightly overweight, suggesting their BMI would negatively influence their overall weight management and counseling practices, findings indicate that it did not adversely impact their discussions with patients about exercising regularly; perhaps because they have fairly good exercise habits. However, because most physician assistants were not meeting the national recommendations for diet and nutrition, they only counseled patients on diet and nutrition 41–60% of the time. These findings underscore the notion that nutrition and

weight-related issues important in the personal lives of clinicians are also reflected in their interactions with patients (Frank et al., 2002). Moreover, because physician assistants did not always adhere to a healthy eating plan, they did not encourage their patients to do so. Again, these results are consistent with the findings of Passey et al. which found that 69% of physicians advised patients *always*, *usually*, or *often* about their diet.

This study also found that like diet, exercise, and weight reduction, physician assistants believed it was *very important* to counsel patients on smoking and alcohol consumption, but felt they were *somewhat effective* in changing patients' behaviors in these areas. However, unlike the low preventive medicine practices found for diet, exercise, and weight reduction, this study found physician assistants incorporated smoking (ask about and advise cessation) and alcohol prevention strategies at higher rates (81–99% and 61–80%, respectively). These findings compliment the study's internal results, which found that 97% of physician assistants were nonsmokers (never smoked or former smokers) and only 7% consumed ≥ 5 drinks per week. Because research has indicated smoking status influences the extent to which physicians inquire about tobacco use and advise cessation (Frank et al., 2010) and has demonstrated that clinicians who drank still counseled their patients on the ill effects of alcohol consumption (Lewis et al., 1991), these findings are appropriate. Additionally, findings are consistent with the results from Passey et al.'s (2010) research, which found that 90.5% of physicians discussed smoking with their patients, and 73% advised on alcohol consumption either *always*, *usually*, or *often*.

Research Questions

Because of the health professionals' role in influencing health behaviors, they have become the target of research inquisition (Coe & Brehm, 1971). Most empirical studies, however, have queried physicians and nurse practitioners, and very few have included physician assistants. As such, the physician assistants' role in influencing patient behavior is virtually unknown. Likewise, the relationship between their habits, attitudes, beliefs, and counseling practices is also unknown. Therefore, the following questions were not only central to this study, but also necessary to understand these providers.

Research Question 1. Although confidence in the ability to counsel patients on healthy lifestyle choices may be related to personal health habits, there is no research that explores this relationship in the physician assistant population. Therefore, Research Question 1 was intended to determine whether or not a relationship existed between physician assistants' personal health habits and their preventive medicine practices.

Statistically significant relationships between healthful eating and general preventive medicine behavior ($p = .020$), overall prevention behavior ($p = .015$), primary prevention ($p = .005$), CVD prevention ($p = .002$), harmful activities ($p = .039$), and substance use ($p = .045$) were found. Physician assistants who followed a healthy eating plan incorporated overall prevention, primary prevention, CVD prevention, harmful activities prevention, and substance use prevention strategies more frequently than did physician assistants who did not follow a healthy eating plan. The relationship between healthful eating and preventive medicine practices identified in this study has also been

demonstrated in previous research. Frank et al. (2002) found that physicians who considered diet and nutrition issues important in their own lives projected this importance in their practice of medicine. Frank et al. also found that physicians who reported healthy dietary habits were more likely to counsel their patients on the importance of a healthful eating. In an earlier study, Frank et al. (2000) reported that physicians who ate at least 5 servings of fresh fruits and vegetables per day were more likely to discuss nutrition with their patients ($p = .046$).

A statistically significant relationship between alcohol consumption and cancer screening score ($p = .007$) was also found; as alcohol consumption increased, cancer screening practices decreased. Though a search of the literature found no published studies on practitioner alcohol use and cancer screening behaviors for direct comparison, Cornuz et al. (2000) found that the consumption of more than three alcoholic beverages per day was a predictor of physicians' negative attitudes toward alcohol screening and counseling. Additionally, research has shown a strong and consistent correlation between clinicians' personal health habits and their counseling and screening practices in the same area (Frank et al., 2000; Frank et al., 2010; Shahar et al., 2009).

Results also showed no relationship between tobacco use and physician assistants' preventive medicine practices. This finding indicates that due to the extremely harmful nature of cigarette use, physician assistants, regardless of their smoking status, consider the utilization of smoking cessation strategies important enough to consistently incorporate them in their practice of medicine. This assumption was supported by the findings of this study which found that 85% of respondents *usually* or *always* asked about

tobacco use or advised quitting, despite their smoking status. Likewise, Meshefedjian, Gervais, Tremblay, Villeneuve and O'Loughlin (2010) found that 91% of general practitioners obtained patients' smoking status during routine visits.

Despite this study finding no relationship between tobacco use and physician assistants' preventive medicine practices, Pipe et al. (2009) found that nonsmoking physicians were more likely than smoking physicians to discuss tobacco use with their patients (45% vs. 34%, $p < 0.001$). Pipe et al.'s study also found that only 41% of physicians discussed smoking at every patient visit and 42% discussed smoking occasionally.

Research Question 2. Despite the fact that motivation to counsel patients on healthy lifestyle choices may be moderated by prevention and counseling attitudes, there is little research that has analyzed this relationship in physician assistants. Thus, Research Question 2 sought to determine whether or not a relationship existed between physician assistants' prevention and counseling attitudes and their preventive medicine practices.

There were statistically significant relationships found between prevention and counseling attitudes and preventive medicine practices ($p < .05$). Findings indicated that the less effective a physician assistant felt they were, the less important health promotion and disease prevention was to them, or the less comfortable they felt delivering preventive care, the less likely they were to practice preventive medicine (i.e. overall prevention, smoking cessation, and hypertension management). The relationship between prevention and counseling attitudes and preventive medicine practices identified in this study has also been demonstrated in previous research. Bellas et al. (2000), Dunn et al.

(2009), and Laws et al. (2009) all found that health care providers who had positive attitudes toward prevention and counseling and believed they were effective at modifying patient behavior were most successful in incorporating health promotion and disease prevention strategies in their practice of medicine.

Vogt et al. (2005) found that while most primary care physicians did not have negative attitudes toward smoking cessation counseling, a significant minority did. Some respondents felt smoking cessation discussions were too time consuming, ineffective, inappropriate, unpleasant, outside their professional duty, or intruded upon patient privacy (Vogt et al., 2005). Furthermore, a study assessing the comfort with, frequency of, and perceived effectiveness of diabetic nutrition counseling by internal medicine residents found that only 56% felt comfortable with diabetic nutrition counseling and 63% counseled on diabetic nutrition compared to 87% for medication adherence (Tang et al., 2009). Findings from Tang et al.'s (2009) study suggest that due to the focus on treatment, rather than prevention, clinicians are more comfortable with chemoprophylaxis counseling than behavior change counseling. This assumption may also hold true for physician assistants; however additional research is needed.

Research Question 3. Even though assurance in the ability to counsel patients on healthy lifestyle choices may be hindered by perceived barriers to the delivery of clinical preventive services, no research to date has examined this relationship in physician assistants. Accordingly, Research Question 3 examined the relationship between physician assistants' perceived barriers to the delivery of clinical preventive services and their preventive medicine practices.

Statistically significant relationships between perceived barriers and general preventive medicine behavior (p = .007), overall prevention behavior (p = .011), primary prevention (p = .017), CVD prevention (p = .003), smoking cessation counseling effectiveness (p = .022), and hypertension management (p = .018) were found. Although a statistically significant relationship existed between physician assistants' perceived barriers to the delivery of clinical preventive services and their preventive medicine practices, the relationship seems counterintuitive. The findings indicate that physician assistants who view barriers as important in hindering effective health promotion and disease prevention have higher frequencies of preventive medicine delivery. This assumption is not supported by previous studies which purport health care providers' perceived barriers are hindrances to the delivery of clinical preventive services (Kolasa & Rickett, 2010; Oscós-Sánchez, et al., 2008; Shires et al., 2012; Whitlock et al., 2002).

Pollak et al. (2008) demonstrated that lack of time was a major contributor to the suboptimal rates of preventive care delivery. Likewise, Yarnall et al. (2009) found that primary care physicians do not have adequate time to deliver the clinical preventive and chronic disease services recommended. As such, approximately 46% of their day was spent on acute care, 38% on chronic disease care, and 16% delivering preventive care (Yarnall et al., 2009). Furthermore, if the recommended guidelines for preventive services and the most common chronic diseases were adhered to, they, along with acute care, would require 21.7 hours a day (Yarnall et al., 2009).

In addition to lack of time, Kolasa and Rickett (2010) found that inadequate training and compensation were barriers to nutrition counseling. Moreover, Caplan et al.

(2011) and Gottlieb et al. (2001) found that inadequate resources, patient noncompliance, language and cultural barriers, lack of patient interest, and lack of preventive care reminder and tracking systems were major barriers to providing smoking cessation counseling. Many of these barriers can be addressed by providing physician assistants with training opportunities and effective strategies for implementing important preventive medicine services in their daily routine with patients.

Research Question 4. Perceived importance of, effectiveness of, and comfort in delivering preventive care may be governed by personal health habits; however, no research to date has investigated this relationship in the physician assistant population. Consequently, Research Question 4 examined the relationship between physician assistants' personal health habits and their prevention and counseling attitudes.

Findings indicate there was a statistically significant relationship between BMI and importance of prevention counseling ($p = .019$). Results suggest the higher the BMI, the more important it was to counsel patients on health promotion and disease prevention topics. Not only is this finding counterintuitive, it is not supported by previous research (Bleich et al., 2012; Howe et al., 2010; Kosteva et al., 2012). Although this study found that the average physician assistant was slightly overweight ($M = 26.22$ kg/m^2), they still felt it was important to counsel their patients on preventive care topics. This finding is supported by previous research which indicates practitioners believe they are undeniably responsible for promoting healthy behavior (Kolasa & Rickett, 2010; Ma et al., 2004) and counseling patients about lifestyle modification (Delnevo et al., 2003; Kolasa & Rickett, 2010; Laws et al., 2009; Ma et al., 2004).

Results also showed statistically significant relationships between exercise status and behavior change effectiveness ($p = .041$) and exercise status and CVD behavior change effectiveness ($p < .01$). The more a physician assistant exercised the more effective they felt they were at changing patients' overall and cardiovascular behaviors. This finding is supported by previous research. Lamarche and Vallance (2013) found that most (56%) nurse practitioners were meeting national exercise guidelines and that there was a statistically significant relationship between meeting guidelines and perceived competence ($p = 0.007$). Additionally, Abramson, et al. (2000) found that physicians who exercised were more likely to counsel their patients on the benefits of exercise, while Hung et al. (2013) found that physician health habits, including exercise status, were associated with their CVD prevention practices.

Furthermore, this study found a statistically significant relationship between diet and prevention and counseling attitudes. More specifically, findings indicate a significant relationship between healthful eating and overall prevention and counseling attitudes ($p < .01$), behavior change effectiveness ($p < .01$), CVD behavior change effectiveness ($p < .001$), smoking cessation counseling effectiveness ($p = .013$); eating five plus servings of fruits and vegetables and behavior change effectiveness ($p = .017$) and CVD behavior change effectiveness ($p < .01$). Physician assistants who followed a healthful eating plan and ate five plus servings of fruits and vegetables on most days felt they were more effective at changing patients' behaviors, felt it was important to counsel on health promotion and disease prevention topics, and felt comfortable addressing sensitive topics. These findings are supported by previous studies. Frank et al. (2002) and Howe et al.

(2010) both found that physicians who reported relatively healthy diets and diet-related habits were more likely to counsel their patients than those who did not adhere to such behaviors.

Research Question 5. Prevention and counseling attitudes may be driven by barriers to the provision of preventive services; however, no study to date has examined this relationship in physician assistants. Therefore, Research Question 5 investigated the relationship between physician assistants' perceived barriers to the delivery of clinical preventive services and their prevention and counseling attitudes.

Statistically significant relationships between perceived barriers and overall prevention and counseling attitudes ($p = .040$), behavior change effectiveness ($p = .041$), importance of prevention counseling ($p = .008$), and importance of CVD counseling ($p = .039$) were found. Results suggest that the more important a barrier was to a physician assistant, the more effective they felt they were and the more important they felt it was for them to counsel patients on health promotion and disease prevention topics. These results, although statistically significant, are counterintuitive and are not supported by other studies such as, Huizinga, Cooper, Bleich, Clark, and Beach (2009), Jallinoja et al. (2007), and Yokell, Camargo, Wang, and Delgado (2014).

Huizinga et al. (2009) found that 39% of physicians surveyed had low respect for obese patients and that this lack of respect resulted in decreased preventive care and patient education during patient encounters. Jallinoja et al. (2007) found that although physicians and nurses felt it was their responsibility to counsel their patients on the benefits of adhering to a healthy lifestyle, a little over half felt they had the skills to

sufficiently assist their patients. Furthermore, Yokell et al. (2014) reported that only 27% of emergency departments performed routine alcohol screening and counseling on patients who presented with an alcohol-related compliant. This low percentage was attributed to the perceived capacity to perform such screening and counseling, as well as lack of time and lack of financial resources (Yokell et al., 2014).

Conceptual Model

This study was guided by a conceptual framework developed based on Lewis' model for predicting the counseling practices of physicians (Lewis et al., 1986; see Figure 2, Chapter 2). The proposed conceptual framework for this study (see Figure 1, Chapter 1) suggests personal health habits and perceived barriers to the delivery of clinical preventive services impact prevention and counseling attitudes, as well as preventive medicine practices, and prevention and counseling attitudes impact both personal health habits and preventive medicine practices.

In order to examine the predictive model proposed in Figure 1, physician assistants' personal health habits, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services were entered into a stepwise multiple regression analysis. Findings indicate only attitudes (behavior change effectiveness and smoking cessation counseling effectiveness) and barriers (cultural differences between providers and patients) predicted physician assistants' preventive medicine practices. These factors accounted for 50% of the explained variability, ($p <$ .05).

Although personal and professional characteristics were not a part of the original model, they were found to account for 30% of the explained variability in predicting physician assistants' preventive medicine practices, ($p < .05$). Therefore, a final investigative stepwise multiple regression analysis was conducted in order to gain a more realistic understanding of the predictive relationship between physician assistants' habits, attitudes, barriers, and characteristics.

Prevention and counseling attitudes (behavior change effectiveness and smoking cessation counseling effectiveness), perceived barriers to the delivery of clinical preventive (cultural differences between providers and patients and personal lack of interest in providing preventive medicine services) and personal and professional characteristics (community health center, surgical subspecialties, other subspecialties, other practice setting, emergency medicine) accounted for 63% of the explained variability in predicting physician assistants' preventive medicine practices, ($p < .05$). Personal health habits were still not significant ($p > .05$) in the model.

These findings indicate that clinical specialty, practice environment, behavior change effectiveness, smoking cessation counseling effectiveness, cultural differences between providers and patients and personal lack of interest in providing preventive medicine services—not lack of time—are largely responsibility for predicting physician assistants' preventive medicine practices. More specifically, physician assistants who worked in primary care, practiced in a community health center, felt they were effective in changing their patients' behaviors and at smoking cessation counseling, and believed cultural differences between providers and patients and personal lack of interest in

providing preventive medicine services are barriers to effective health promotion and disease prevention were more apt to practice preventive medicine during the past 60 days. These findings are consistent with other studies.

Frank et al. (2000) found that being a primary care physician was significantly associated with the delivery of preventive care services. Similarly, the AHRQ (2004) found that patients receiving care from community health centers received more preventive medicine services than the general population. Furthermore, Dunn et al. (2009), Howe et al. (2010), and Oberg & Frank (2009) found that practitioners who believed they were effective at modifying patient behaviors were more apt to implement preventive services in their practice of medicine. Lastly, Caplan et al. (2011) found that along with other barriers, cultural barriers hindered the provision of smoking cessation counseling.

Limitations of the Study

This study provided a novel, comprehensive, and much needed evaluation of physician assistants' preventive medicine practices, personal health habits, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services; however, its limitations should be discussed.

As identified in Chapter 1, the main limitation of this study was the use of a cross-sectional design. Although this design provided an opportunity to describe physician assistants' health habits, attitudes, perceived barriers, and preventive medicine practices, it is not useful in establishing causal or temporal relationships. Additionally, because of the use of nonprobability sampling rather than random sampling, selection bias may have

been introduced. Likewise, because this study relied on the self-reporting behaviors of physician assistants, recall bias may have become a confounder, thus affecting the study's validity.

Although it was expected that respondents would answer honestly, it is possible that they may have overestimated their preventive medicine practices and prevention and counseling attitudes, and understated their perceptions on the barriers that hinder health promotion and disease prevention. In addition, because the study used a group-administered survey, participants may have felt as though their anonymity was threatened by the presence of the researcher, and therefore may not have expressed their true feelings and opinions.

Furthermore, the study only surveyed licensed physician assistants attending a professional conference, therefore extrapolation to all physician assistants should be performed cautiously since the characteristics of nonconference attendees may influence their health habits, attitudes, beliefs, and preventive medicine practices in different ways. Moreover, findings do not explain the preventive medicine practices of physicians or nonphysician health care providers, such as nurse practitioners; although, it is likely that general findings may apply to these populations as well. Finally, due to the lack of published research on physician assistants and the variables explored in this study, assumptions were drawn and results were interpreted based on research that focused on physicians and nurse practitioners. Because of this, findings may be out of context.

Recommendations for Future Research

While this inquisition provides insight into the physician assistant population and addresses an unanswered research need, it does not serve as a complete remedy to the sizable literature gap. Instead, it should be seen as the foundation and opportunity for further research and social change.

Research in the most fundamental sense is a systematic inquiry designed to extend or create new knowledge. Though this study provided a snapshot of physician assistants' practices, habits, and attitudes; generalizations to other physician assistants may not be appropriate. Consequently, the first and most pressing recommendation is to replicate the current study using a larger nationwide sample in order to allow for diversification and generalizability of findings. Likewise, conducting this study using a longitudinal research design would allow researchers to make several observations about physician assistants over a period of time. In addition, future studies should audit patient charts in order to validate self-reported behaviors. Similarly, patient surveys may offer additional insight into physician assistants' preventive medicine practices and should be used in future inquires.

Because only 63% of the explained variability in predicting physician assistants' preventive medicine practices was explained by the variables explored in this study, future studies should investigate other factors that influence their practices. Furthermore, results indicate physician assistants in primary care specialties were more likely to deliver preventive services and to believe they were effective at changing patient behavior. However, because primary care specialties were grouped, a comparison between

specialties was not possible. Therefore, future studies should compare physician assistants of differing specialties (family medicine, urgent care, general internal medicine, and obstetrics/gynecology). Additionally, comparison studies should evaluate preventive medicine practices by location (rural, urban, suburban), patient insurance (Medicare/Medicaid, private/other, uninsured), and type of visit (wellness check, acute, chronic disease management) in order to broaden results, reveal differences, and highlight trends. Moreover, because physician assistants are trained in a medical model similar to that of physicians, it is recommended that future studies compare the preventive medicine practices of both professions. As well, comparing physician assistants, nurse practitioners, and physicians in the same medical practice may extend the knowledge in this area.

Aside from the suggestions above, the most crucial recommendation is for researchers to contribute to the examination of the profession and disseminate their findings at professional conferences and through peer-reviewed journals. Although this advice applies to all researchers, it is especially true for recent graduates. It is one thing to conduct research, but it is entirely another to disseminate the findings. As a scholar-practitioner, it is important to take action, create new understandings, and strengthen the body of knowledge through research dissemination.

Social Change Implications

Social change is the alteration of knowledge, structures, policies, practices, and functions of society (Shah, 2013). In essence, social change is transformational. Because this study is the first of its kind, the potential social change implications contributed by

the findings begin with the mere knowledge of the relationship between physicians' preventive medicine practices, personal and professional characteristics, personal health habits, prevention and counseling attitudes, and perceived barriers to the delivery of clinical preventive services. Although additional research in this area should be conducted, this study has, in part, addressed the research gap.

Previous studies have indicated that nonphysician providers are more likely than physicians to use preventive care strategies in their practice of medicine (Reed & Selleck, 1996). As such, physician assistants are in a unique position to create patient relationships, promote health promotion and disease prevention, and aid in behavioral modification. Similarly, patients perceive medical professionals to be a viable source of health information and report being more likely to adhere to healthy behaviors when encouraged by their health care provider (Pool et al., 2013). As this study and others have demonstrated, health care providers regardless of specialty believe it is important to counsel patients on preventive care. For that reason, it is imperative that physician assistants use their position and credibility as health communicators and health educators to promote healthy behaviors in their patients. The key is to remember that every patient encounter, in every clinical setting, is an opportunity to counsel on the benefits of health promotion and disease prevention.

In order to increase the frequency of preventive medicine delivery, the most important social change implication is to it highlight and execute health promotion and disease prevention as national priorities and emphasize their importance in physician assistant training programs; initial certification, certification maintenance, and

recertification requirements; during professional conferences, and through personal and professional development.

Specifically, physician assistant training programs should use the findings of this study to implement curriculum that addresses the role of health promotion and disease prevention in health care, as well as its importance during every patient encounter, regardless of specialty or clinical setting. Similarly, learning opportunities that help foster student's comfort with and efficacy in discussing health promotion and disease prevention strategies with patients should also be employed. Equally, continuing medical education requirements should include either a preventive care category (i.e., Category 3) or require that a certain number of Category 1 credits focus on preventive care delivery. Moreover, the American Public Health Association (APHA) should be designated as a provider and sponsor of Category 1 activities. Additionally, offering a Preventive Medicine Certificate of Added Qualification may prove beneficial to those who would like to document their experience and expertise in the area of health promotion and disease promotion. Furthermore, state and national physician assistant and public health associations should provide conference attendees with interactive case presentations, workshops, seminars, and continuing medical education opportunities focused on improving personal development and preventive care delivery skills. Likewise, because health promotion and disease prevention activities are not siloed, but rather cross medicine–public health disciplines, there should be more collaboration between public health and physician assistant associations. Through targeted efforts, each can aid in the

personal and professional development of their members, advance their missions, serve their communities, and better address the health issues faced by many.

Since barriers were identified as impediments to the provision of effective health promotion and disease prevention delivery, addressing the interplay between provider, patient, and system constraints is necessary. Likewise, supporting facilitators of preventive care delivery should also be considered. Because health promotion and disease prevention interventions have been identified as the key to reducing the burden of chronic disease, understanding this relationship may mobilize knowledge, enhance physician assistant practice, and improve patient outcomes.

Furthermore, physician assistants may find the results of this study of particular interest. Since research suggests practitioners who have positive attitudes toward prevention and counseling, believe they are effective at modifying patient behaviors, and engage in healthy activities themselves are more apt to implement preventive services in their practice of medicine, physician assistants may consider assessing their own personal health habits and prevention and counseling attitudes to see if there are areas that can be modified. Perhaps this self-assessment will encourage them to make necessary changes, maintain a healthy lifestyle, and adopt positive attitudes toward prevention and counseling, not only because these factors are necessary for their own health, but because they may extend well into their health care practices, making them more effective at improving patient outcomes.

Finally, this study found that in context of other research (AAPA, 2014; Coplan et al., 2013; Hooker, 2006; Hooker & Berlin, 2002, Scheffler & Stinson, 1974), the racial

and ethnic characteristics of the typical physician assistant has not changed much since the inception of the profession. These findings are of particular concern because it reflects the lack of diversity in the profession. As the U.S. population continues to diversify, there will be an increased need for racial and ethnic minority physician assistants. Research has indicated that health care professionals from these backgrounds are more likely to practice in underserved, low-socioeconomic, and minority communities (Cooper & Powe, 2004; U.S. Department of Health and Human Services [USDHHS], 2006). Research also indicates that patient–provider race and ethnic concordant relationships increase patient comfort, trust, satisfaction, and adherence (Cooper & Powe, 2004; USDHHS, 2006). Therefore, it is recommended that physician assistant training programs work toward recruiting more students from racial and ethnic minority backgrounds. By strengthening the diversity of the physician assistant workforce, patients, especially those from disadvantaged populations, may experience improved care, fewer disparities, and better outcomes.

Conclusion

The integration of prevention in clinical settings has been cited as the means to reducing morbidity, mortality, and impaired functioning (Dalle Grave et al., 2010; Mokdad et al., 2004; Moquaddam et al., 2007; WHO, 2013). As such, given their position, physician assistants have the responsibility and unique opportunity to assess risk factors, suggest behavioral modification, recommend preventive services, and prescribe appropriate chemoprophylaxis early in the spectrum of care (USPSTF, 1996; Whitlock et al., 2002). By incorporating these strategies, physician assistants are able to assist in the

protection, promotion, and maintenance of health and wellbeing, as well as the prevention of disease, disability, and premature death (ABoPM, 2011).

Although this study found that physician assistants believed it was important to counsel patients on health promotion and disease prevention, their preventive medicine practices were somewhat low. This phenomenon was explained by the internal findings of the study, which revealed that there were significant relationships between physician assistants' practices, personal health habits, prevention and counseling attitudes, and perceptions of the barriers that hinder the provision of preventive care. Overall, physician assistants with positive attitudes toward prevention and counseling, who believed they were effective at modifying patient behaviors, and who adhered to healthy behaviors themselves were more likely to implement preventive services in their practice of medicine. Further analysis revealed that clinical specialty, practice environment, behavior change effectiveness, smoking cessation counseling effectiveness, cultural differences between providers and patients, and personal lack of interest in providing preventive services accounted for sixty-three percent of the explained variability in predicting physician assistants' preventive medicine practices. This finding suggests that factors not explored in this study are also important in predicting physician assistants' preventive medicine practices and should be considered in future research.

Understanding the habits, attitudes, and beliefs of physician assistants, as well as the factors that influence their delivery of preventive medicine has several social change implications, including closing a longstanding research gap; serving as the foundation for professional development and curriculum changes in physician assistant training

programs; espousing a national agenda with an increased focus and emphasis on health promotion and disease prevention; instituting policies that effectively address the interaction between provider, patient, and system constraints; soliciting targeted collaborations between physician assistant and public health organizations; diversifying the professional through the recruitment of more racial and ethnic minorities, and encouraging physician assistants to adopt positive prevention and counseling attitudes and maintain healthy lifestyles. Collectively, these implications will ultimately improve patient health status and outcomes.

In conclusion, positive social change in reducing morbidity, mortality, and impaired functioning is feasible, but only if health promotion and disease prevention strategies became the norm in every patient encounter, by every physician assistant, regardless of specialty or clinical setting. In order to achieve this goal, physician assistants will need to modify their personal health habits, establish more positive prevention and counseling attitudes, and find ways to overcome the barriers that have been found to hinder the delivery of clinical preventive services.

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Appendix A: PAEA Program Directory

Program	State	Status
Adventist University of Health Sciences	Florida	Developing-Not Accredited
Albany Medical College	New York	Accredited
Alderson-Broaddus University	West Virginia	Accredited
Anne Arundel Community College	Maryland	Accredited
Arcadia University	Pennsylvania	Accredited
Arizona School of Health Sciences	Arizona	Accredited
Augsburg College	Minnesota	Accredited
Baldwin Wallace University	Ohio	Accredited-Provisional
Barry University	Florida, Virgin Islands	Accredited
Bay Path University	Massachusetts	Accredited-Provisional
Baylor College of Medicine	Texas	Accredited
Bethel University	Tennessee	Accredited
Bethel University	Minnesota	Accredited-Provisional
Boston University	Massachusetts	Accredited-Provisional
Bryant University	Rhode Island	Accredited-Provisional
Butler University	Indiana	Accredited
Campbell University	North Carolina	Accredited
Carroll University	Wisconsin	Accredited
CCNY Sophie Davis School of Biomedical Education	New York	Accredited
Central Michigan University	Michigan	Accredited-Probationary
Chapman University	California	Developing-Not Accredited
Charles R. Drew University	California, North Carolina	Developing-Not Accredited
Chatham University	Pennsylvania	Accredited
Christian Brothers University	Tennessee	Accredited-Provisional
Clarkson University	New York	Accredited-Provisional
Concordia University	Wisconsin	Accredited-Provisional
Cornell University	New York	Accredited
CUNY York College	New York	Accredited
Cuyahoga Community College/Cleveland State University	Ohio	Accredited
D'youville College	New York	Accredited
Daemen College	New York	Accredited
Des Moines University	Iowa	Accredited
Desales University	Pennsylvania	Accredited
Drexel University	Pennsylvania	Accredited
Duke University Medical Center	North Carolina	Accredited
Duquesne University	Pennsylvania	Accredited
East Carolina University	North Carolina	Accredited
Eastern Michigan University	Michigan	Accredited-Provisional
Eastern Virginia Medical School	Virginia	Accredited

(table continues)

Program	State	Status
Elon University	North Carolina	Accredited-Provisional
Emory University	Georgia	Accredited
Franklin Pierce University	New Hampshire	Accredited
Gannon University	Pennsylvania	Accredited
George Washington University	District of Columbia	Accredited
Georgia Regents University	Georgia	Accredited
Grand Valley State University	Michigan	Accredited
Harding University	Arkansas	Accredited
Herbert Wertheim College of Medicine (FIU)	Florida	Developing-Not Accredited
Heritage University	Washington	Accredited-Provisional
High Point University	North Carolina	Accredited-Provisional
Hofstra University	New York	Accredited
Howard University	District of Columbia	Accredited
Idaho State University	Idaho	Accredited
Indiana State University	Indiana	Accredited
Indiana Univ School of Hlth & Rehabilitation Sciences	Indiana	Accredited-Provisional
Interservice	Texas	Accredited
James Madison University	Virginia	Accredited
Jefferson College of Health Sciences	Virginia	Accredited
Johnson & Wales University	Rhode Island	Accredited-Provisional
Keiser University	Florida	Accredited
Kettering College	Ohio	Accredited
King's College	Pennsylvania	Accredited
Lake Erie College	Ohio	Accredited-Provisional
Le Moyne College	New York	Accredited
Lenoir-Rhyne University	North Carolina	Developing-Not Accredited
Lincoln Memorial	Tennessee	Accredited
Lock Haven University	Pennsylvania	Accredited
Loma Linda University	California	Accredited
Long Island University	New York	Accredited
Louisiana State University - New Orleans	Louisiana	Accredited-Provisional
Louisiana State University - Shreveport	Louisiana	Accredited
Lynchburg College	Virginia	Developing-Not Accredited
Marietta College	Ohio	Accredited
Marist College	New York	Developing-Not Accredited
Marquette University	Wisconsin	Accredited
Marshall B. Ketchum University	California	Accredited-Provisional
Mary Baldwin College	Virginia	Developing-Not Accredited
Marywood University	Pennsylvania	Accredited
MCPHS University (Boston)	Massachusetts	Accredited
MCPHS University (Manchester/Worcester)	New Hampshire	Accredited

(table continues)

Program	State	Status
MCPHS University (Manchester/Worcester)	Massachusetts	Accredited
Medical University of South Carolina	South Carolina	Accredited-Probationary
Mercer University	Georgia	Accredited
Mercy College	New York	Accredited
Mercyhurst University	Pennsylvania	Developing-Not Accredited
Methodist University	North Carolina	Accredited
MGH Institute of Health Professions	Massachusetts	Accredited-Provisional
Miami-Dade College	Florida	Accredited
Midwestern University (Downers Grove)	Illinois	Accredited
Midwestern University (Glendale)	Arizona	Accredited
Misericordia University	Pennsylvania	Accredited-Provisional
Mississippi College	Mississippi	Accredited
Missouri State University	Missouri	Accredited
Monmouth University	New Jersey	Accredited-Provisional
Moreno Valley College	California	Accredited-Probationary
New York Institute of Technology	New York	Accredited
Northeastern University	Massachusetts	Accredited
Northern Arizona University	Arizona	Accredited-Provisional
Northwestern University	Illinois	Accredited
Nova Southeastern University, Fort Lauderdale	Florida	Accredited
Nova Southeastern University, Jacksonville	Florida	Accredited
Nova Southeastern University, Orlando	Florida	Accredited-Probationary
Nova Southeastern University, Southwest Florida	Florida	Accredited
Ohio Dominican University	Ohio	Accredited-Provisional
Oregon Health & Science University	Oregon	Accredited
Our Lady of the Lake College	Louisiana	Accredited
Pace University	New York	Accredited
Pacific University	Oregon	Accredited
Penn State University	Pennsylvania	Accredited-Provisional
Pennsylvania College of Technology	Pennsylvania	Accredited
Philadelphia College of Osteopathic Medicine	Pennsylvania	Accredited
Philadelphia University	Pennsylvania	Accredited
Quinnipiac University	Connecticut	Accredited
Red Rocks Community College	Colorado	Accredited
Rochester Institute of Technology	New York	Accredited
Rocky Mountain College	Montana	Accredited
Rocky Mountain University	Utah	Developing-Not Accredited
Rosalind Franklin University of Medicine	Illinois	Accredited
Rush University	Illinois	Accredited
Rutgers University	New Jersey	Accredited
Sacred Heart University	Connecticut	Developing-Not Accredited

(table continues)

Program	State	Status
Saint Catherine University	Minnesota	Accredited-Provisional
Saint Francis University	Pennsylvania	Accredited
Saint Louis University	Missouri	Accredited
Salus University	Pennsylvania	Accredited
Samuel Merritt College	California	Accredited
San Joaquin Valley College	California	Accredited-Probationary
Seton Hall University	New Jersey	Accredited
Seton Hill University	Pennsylvania	Accredited
Shenandoah University	Virginia	Accredited
South College	Tennessee	Accredited
South University	Georgia	Accredited
South University, Tampa	Florida	Accredited
Southern Illinois University	Illinois	Accredited
Springfield College	Massachusetts	Accredited
St. Ambrose University	Iowa	Accredited-Provisional
St. John's University	New York	Accredited
Stanford University	California	Accredited
Stony Brook University	New York	Accredited
Sullivan University	Kentucky	Accredited-Provisional
SUNY Downstate Medical Center	New York	Accredited
SUNY Upstate Medical Center	New York	Accredited
Texas Tech University Health Sciences Center	Texas	Accredited-Probationary
Thomas Jefferson University	Pennsylvania	Accredited-Provisional
Touro College (Bay Shore)	New York	Accredited
Touro College (Manhattan)	New York	Accredited
Touro University - California	California	Accredited
Touro University Las Vegas	Nevada	Accredited
Towson University CCBC - Essex	Maryland	Accredited-Probationary
Trevecca Nazarene University	Tennessee	Accredited
Tufts University School of Medicine	Massachusetts	Accredited-Provisional
Union College	Nebraska	Accredited
University of Alabama at Birmingham	Alabama	Accredited
University of Arkansas	Arkansas	Accredited-Provisional
University of Bridgeport	Connecticut	Accredited
University of California-Davis	California	Accredited
University of Charleston	West Virginia	Accredited-Provisional
University of Colorado	Colorado	Accredited
University of Dayton	Ohio	Accredited-Provisional
University of Detroit/Mercy	Michigan	Accredited
University of Findlay	Ohio	Accredited
University of Florida	Florida	Accredited
University of Iowa	Iowa	Accredited

(table continues)

Program	State	Status
University of Kentucky	Kentucky	Accredited
University of Maryland Eastern Shore	Maryland	Accredited
University of Missouri - Kansas City	Missouri	Accredited-Provisional
University of Mount Union	Ohio	Accredited
University of Nebraska	Nebraska	Accredited
University of New England	Maine	Accredited
University of New Mexico	New Mexico	Accredited-Probationary
University of North Carolina	North Carolina	Developing-Not Accredited
University of North Dakota	North Dakota	Accredited
University of North Texas HS Center Ft Worth	Texas	Accredited
University Of Oklahoma, Oklahoma City	Oklahoma	Accredited
University of Oklahoma, Tulsa	Oklahoma	Accredited
University of Pittsburgh	Pennsylvania	Accredited
University of South Alabama	Alabama	Accredited
University of South Dakota	South Dakota	Accredited
University of Southern California	California	Accredited
University of St. Francis	New Mexico	Accredited
University of St. Francis (Fort Wayne)	Indiana	Accredited
University of Tennessee Health Science Center	Tennessee	Accredited-Provisional
University of Texas - HS Center at San Antonio	Texas	Accredited
University of Texas - Medical Branch at Galveston	Texas	Accredited
University of Texas - Pan American	Texas	Accredited
University of Texas - SW School of Health Professions	Texas	Accredited
University of the Cumberlands	Kentucky	Accredited-Provisional
University of the Sciences of Philadelphia	Pennsylvania	Accredited-Provisional
University of Toledo	Ohio	Accredited
University of Utah	Utah	Accredited
University of Washington	Washington	Accredited
University of Wisconsin - La Crosse	Wisconsin	Accredited
University of Wisconsin - Madison	Wisconsin	Accredited
Wagner College	New York	Accredited
Wake Forest University	North Carolina	Accredited
Wayne State University	Michigan	Accredited
West Liberty University	West Virginia	Accredited-Provisional
Western Michigan University	Michigan	Accredited
Western University of Health Sciences	California	Accredited
Wichita State University	Kansas	Accredited
Wingate University	North Carolina	Accredited
Yale University School of Medicine	Connecticut	Accredited

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Appendix B: Physician Assistant Preventive Medicine Practices' Booth

Appendix C: Informed Consent/Introduction Letter

Dear Physician Assistant:

I need your help…

My name is Judia Yael Malachi; I am a PhD in Public Health candidate at Walden University. I am conducting my dissertation research on the preventive medicine practices of physician assistants. I am inviting you to participate in this groundbreaking study because you are a physician assistant and your input is invaluable. Before agreeing to participate, I ask that you read this form in its entirety and ask questions you may have.

Background:

The purpose of this study is to examine the factors that influence the preventive medicine practices of physician assistants. Findings from this study will address a critical research need, serve as a baseline for creating effective interventions for physician assistant health promotion and disease prevention practices, and contribute to the overall improvement of patient care.

Procedure:

If you agree to participate, you will be asked to complete a brief survey. The survey will take approximately 10 minutes and all responses are anonymous and confidential.

Voluntary Nature of the Study:

Your participation is completely voluntary. You have the right to decline participation without prejudice. Even if you decide to participate, should you choose to withdraw your participation at a later time, you have the right to do so.

Risks and Benefits:

The risks of voluntarily participating in this study are minimal. The survey asks about your personal and professional characteristics, health habits, and prevention and counseling practices and attitudes. The benefit of participating is your contribution to the important outcomes listed above.

Compensation:

As an incentive for participating in the study, you will have the opportunity to request a free copy of the latest Guide to Clinical Preventive Services and/or download the Electronic Preventive Services Selector. Both resources are published by the Agency for Healthcare Research and Quality and allow clinicians to identify clinical preventive services that are appropriate for their patients.

Confidentiality:

Survey responses are anonymous and confidential. Your responses will be entered into and stored on a secure server through SurveyMonkey, as well as on a flash drive that will be kept in a locked file cabinet. Access to the survey responses will be limited to me and my dissertation committee. Additionally, data from this study will be kept on file for at least five (5) years as required by Walden University.

The final dissertation will be published by *ProQuest UMI Dissertation Publishing*, and study results will be included in manuscripts submitted to professional journals for publication. Information published will be general in nature and will not include any of your personal information.

Statement of Consent:

Completion of the survey indicates you (a) read this form in its entirety, (b) understand the study well enough to make an informed decision about your involvement, and (c) consent to participating in this research study.

Contacts and Questions:

If you have questions about this study or your participation, you may contact me via email at jmala001@waldenu.edu. You may also contact my Dissertation Chair, Dr. Richard Palmer, at richard.palmer@waldenu.edu. If you have questions about your rights as a research participant, you may contact Dr. Leilani Endicott, Walden University IRB representative, at 1-800-925-3368, ext. 3121210, or via email at irb@waldenu.edu. Walden University's approval number for this study is 03-03-2014-0027467 and it expires on March 2, 2015.

*****Please save this consent form for your records*****

Thank you for your participation!!!

Sincerely,

Judia Yael Malachi, MPH, CHES
Walden University, PhD candidate

Appendix D: Physician Assistants' Preventive Medicine Practices Questionnaire

Section 1: Personal Characteristics

1. What is your gender?
   - ☐ Male ☐ Female

2. Which of the following best represents your race/ethnicity?
   - ☐ American Indian or Alaska Native
   - ☐ Asian
   - ☐ Black or African American
   - ☐ Hispanic/Latino
   - ☐ Native Hawaiian or Other Pacific Islander
   - ☐ White or Caucasian, not Hispanic
   - ☐ Multi-racial/Multi-ethnic

3. Which of the following represents your age?
   - ☐ 30 or younger ☐ 31–45
   - ☐ 46–64 ☐ 65 or older

Section 2: Personal Health Habits

1. What is your height (in feet and inches)?
   _____ feet _____ inches

2. What is your weight (in pounds)?
   _____ lbs

3. What is your smoking status?
   - ☐ Never smoked
   - ☐ Former smoker
   - ☐ 1–10 cigarettes per day
   - ☐ > 10 cigarettes per day

4. How many times per week do you exercise?
   - ☐ No exercise ☐ 1–2 times per week
   - ☐ 3–4 times per week ☐ ≥ 5 times per week

5. What is your alcohol intake?
   - ☐ No alcohol ☐ 1–2 drinks per week
   - ☐ 3–4 drinks per week ☐ ≥ 5 drinks per week

6. How many of the last ***seven days*** have you followed a healthful eating plan?
   ☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

7. On how many of the last ***seven days*** did you eat five or more servings of fruits and vegetables?
   ☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

8. On how many of the last ***seven days*** did you eat high fat foods such as red meat or full-fat dairy products?
   ☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

9. What is your regular source of care?
   - ☐ No RSOC
   - ☐ Self-treated
   - ☐ Clinician in own group practice
   - ☐ Clinician independent of group practice
   - ☐ Other source of care

Section 3: Professional Characteristics

1. How long have you been licensed as a physician assistant?
   - ☐ Less than 5 years
   - ☐ 5–10 years
   - ☐ 11–20 years
   - ☐ More than 20 years

2. Which best represents your ***primary*** clinical specialty?
   - ☐ Primary Care *(Family Medicine, Urgent Care, General Internal Medicine, General Pediatrics, OB/GYN)*
   - ☐ Internal Medicine Subspecialties
   - ☐ Emergency Medicine
   - ☐ Surgical Subspecialties
   - ☐ Other Specialties

3. Are you currently practicing medicine (***actively managing patients***) as a physician assistant?
   - ☐ Yes *(please continue)*
   - ☐ No *(**STOP**, please return your survey)*

4. In which *region (state)* do you currently practice?
   - ☐ Northeast (*CT, MA, ME, NH, NJ, NY, PA, RI, VT*)
   - ☐ Midwest (*IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, SD, WI)*
   - ☐ South *(AL, AR, DC, DE, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA, WV)*
   - ☐ West *(AK, AZ, CA, CO, HI, ID, MT, NM, NV, OR, UT, WA, WY)*
   - ☐ Other/U.S. Territory *(American Samoa, Guam, Northern Mariana Islands, U.S. Virgin Islands)*

5. How would you describe your practice environment?
   - ☐ Hospital
   - ☐ Physician Group or Solo Practice
   - ☐ Community Health Center
   - ☐ Certified Rural Health Clinic
   - ☐ Other

6. On average, how many hours do you work per week?
   - ☐ Less than 20
   - ☐ 21–30
   - ☐ 31–40
   - ☐ More than 40

7. On average, how many patients do you see daily?
   - ☐ Less than 10
   - ☐ 10–20
   - ☐ 21–30
   - ☐ More than 30

8. Do you treat adult patients?
   - ☐ Yes *(please continue)*
   - ☐ No ***(STOP**, please return your survey)*

Section 4: Preventive Medicine Activities

During the past 60 days, with an adult patient, how often did you **ask** about the following?

	Never 0%	Rarely 1–20%	Some-times 21–40%	About half the time 41–60%	Often 61–80%	Usually 81–99%	Always 100%
1. Alcohol use	☐	☐	☐	☐	☐	☐	☐
2. Diet	☐	☐	☐	☐	☐	☐	☐
3. Exercise	☐	☐	☐	☐	☐	☐	☐
4. Immunization history	☐	☐	☐	☐	☐	☐	☐
5. Oral health care	☐	☐	☐	☐	☐	☐	☐
6. Screening for colon cancer	☐	☐	☐	☐	☐	☐	☐
7. Seatbelt use	☐	☐	☐	☐	☐	☐	☐
8. Number of recent sexual partners	☐	☐	☐	☐	☐	☐	☐
9. Contraception use	☐	☐	☐	☐	☐	☐	☐
10. Smoke detectors in the home	☐	☐	☐	☐	☐	☐	☐
11. Symptoms of depression	☐	☐	☐	☐	☐	☐	☐
12. Tobacco use	☐	☐	☐	☐	☐	☐	☐
13. Illicit drugs	☐	☐	☐	☐	☐	☐	☐
14. *For Female Patients: (If 18+)* pap smear history	☐	☐	☐	☐	☐	☐	☐
15. *(If 40+)* mammogram history	☐	☐	☐	☐	☐	☐	☐

During the past 60 days, when you saw an asymptomatic adult patient with no significant past medical history, how often did you **advise** the patient to:

	Never 0%	Rarely 1–20%	Some-times 21–40%	About half the time 41–60%	Often 61–80%	Usually 81–99%	Always 100%
1. Exercise regularly	☐	☐	☐	☐	☐	☐	☐
2. Increase consumption of fruits and vegetables	☐	☐	☐	☐	☐	☐	☐
3. Decrease dietary fat consumption	☐	☐	☐	☐	☐	☐	☐
4. Always use a seatbelt	☐	☐	☐	☐	☐	☐	☐

During the past 60 days, when you saw an adult patient who was **overweight**, how often did you **advise** the patient to:

	Never 0%	Rarely 1–20%	Some-times 21–40%	About half the time 41–60%	Often 61–80%	Usually 81–99%	Always 100%
1. Exercise regularly	☐	☐	☐	☐	☐	☐	☐
2. Decrease caloric intake	☐	☐	☐	☐	☐	☐	☐
3. Set a goal for weight loss	☐	☐	☐	☐	☐	☐	☐
4. Decrease dietary fat consumption	☐	☐	☐	☐	☐	☐	☐
5. Get a plasma glucose test for diabetes	☐	☐	☐	☐	☐	☐	☐
6. Set specific exercise goals in terms of frequency and duration	☐	☐	☐	☐	☐	☐	☐
7. Perform specific exercises	☐	☐	☐	☐	☐	☐	☐

During the past 60 days, when you saw a patient who **smoked cigarettes**, how often did you:

	Never 0%	Rarely 1–20%	Some-times 21–40%	About half the time 41–60%	Often 61–80%	Usually 81–99%	Always 100%
1. Advise the patient to quit smoking	☐	☐	☐	☐	☐	☐	☐
2. Advise setting a specific "quit date"	☐	☐	☐	☐	☐	☐	☐
3. Have a staff member call the patient a week after the quit date	☐	☐	☐	☐	☐	☐	☐
4. Refer the patient to a group clinic or intensive smoking cessation program	☐	☐	☐	☐	☐	☐	☐
5. Prepare the patient for withdrawal symptoms	☐	☐	☐	☐	☐	☐	☐
6. Prescribe a nicotine patch or gum	☐	☐	☐	☐	☐	☐	☐
7. Provide self-help materials	☐	☐	☐	☐	☐	☐	☐

During the past 60 days, for a patient with **high blood pressure**, how often did you:

	Never 0%	Rarely 1–20%	Some-times 21–40%	About half the time 41–60%	Often 61–80%	Usually 81–99%	Always 100%
1. Review health risks of hypertension	☐	☐	☐	☐	☐	☐	☐
2. Advise weight loss for patients who are overweight	☐	☐	☐	☐	☐	☐	☐
3. Advise salt reduction	☐	☐	☐	☐	☐	☐	☐
4. Talk about the importance of taking medication regularly	☐	☐	☐	☐	☐	☐	☐

Section 5: Preventive Medicine Attitudes and Beliefs

How **effective** are you in changing your patients' behavior with respect to:

	Very effective	Moderately effective	Somewhat effective	Minimally effective	Do not Counsel
1. Alcohol consumption	☐	☐	☐	☐	☐
2. Safe sex practices	☐	☐	☐	☐	☐
3. Illegal drug use	☐	☐	☐	☐	☐
4. Exercise	☐	☐	☐	☐	☐
5. Healthy diet	☐	☐	☐	☐	☐
6. Smoking cessation	☐	☐	☐	☐	☐
7. Weight reduction	☐	☐	☐	☐	☐
8. Seatbelt use	☐	☐	☐	☐	☐
9. Stress management	☐	☐	☐	☐	☐
10. Injury prevention	☐	☐	☐	☐	☐
11. Violence prevention	☐	☐	☐	☐	☐
12. UV exposure	☐	☐	☐	☐	☐

In general, how **important** is it for physician assistants to **counsel** patients about the following?

	Very important	Moderately important	Somewhat important	Not very important
1. Alcohol consumption	☐	☐	☐	☐
2. Safe sex practices	☐	☐	☐	☐
3. Illegal drug use	☐	☐	☐	☐
4. Cholesterol	☐	☐	☐	☐
5. Blood pressure	☐	☐	☐	☐
6. Exercise	☐	☐	☐	☐
7. Healthy diet	☐	☐	☐	☐
8. Smoking	☐	☐	☐	☐
9. Weight reduction	☐	☐	☐	☐
10. Seatbelt use	☐	☐	☐	☐
11. Stress/relaxation	☐	☐	☐	☐
12. Injury prevention	☐	☐	☐	☐
13. Violence prevention	☐	☐	☐	☐
14. UV exposure	☐	☐	☐	☐
15. Depression management	☐	☐	☐	☐

To what extent do you agree with each of the following statements:

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
1. I feel comfortable discussing illegal drug use with patients.	☐	☐	☐	☐	☐
2. I feel comfortable discussing sexual behavior with patients.	☐	☐	☐	☐	☐
3. I feel comfortable asking patients about their sexual orientation.	☐	☐	☐	☐	☐
4. I feel comfortable counseling patients about HIV/AIDS.	☐	☐	☐	☐	☐
5. Smoking cessation counseling is an effective use of my time as a physician assistant.	☐	☐	☐	☐	☐
6. For most patients, health education does little to promote their adherence to a healthy lifestyle.	☐	☐	☐	☐	☐
7. I am less effective than professional counselors in getting patients to quit smoking.	☐	☐	☐	☐	☐
8. Patients without symptoms will rarely change their behavior on the basis of my advice.	☐	☐	☐	☐	☐
9. Most patients try to change their lifestyles if I advise them to do so.	☐	☐	☐	☐	☐

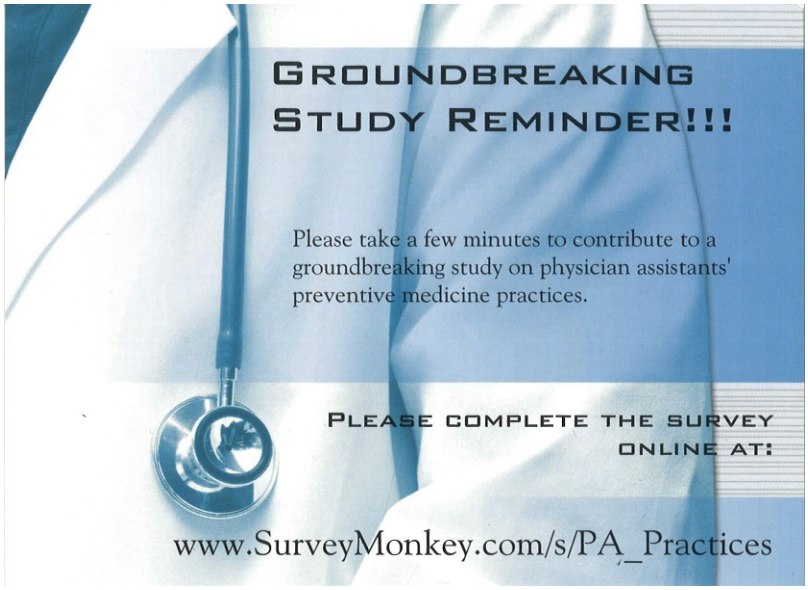
In your medical practice, how important are the following potential barriers to effective health promotion and disease prevention?

	Not important	Minimally important	Somewhat important	Moderately important	Very important
1. Lack of time	☐	☐	☐	☐	☐
2. Lack of availability of health educators	☐	☐	☐	☐	☐
3. Insufficient reimbursement for preventive services	☐	☐	☐	☐	☐
4. Lack of systems for tracking and promoting preventive care	☐	☐	☐	☐	☐
5. Personal lack of interest in providing preventive services	☐	☐	☐	☐	☐
6. Lack of patient interest in prevention	☐	☐	☐	☐	☐
7. Uncertainty about what preventive services to provide	☐	☐	☐	☐	☐
8. Lack of proper patient education materials	☐	☐	☐	☐	☐
9. Communication difficulties with patients	☐	☐	☐	☐	☐
10. Cultural differences between providers and patients	☐	☐	☐	☐	☐
11. The patient came for a different purpose	☐	☐	☐	☐	☐

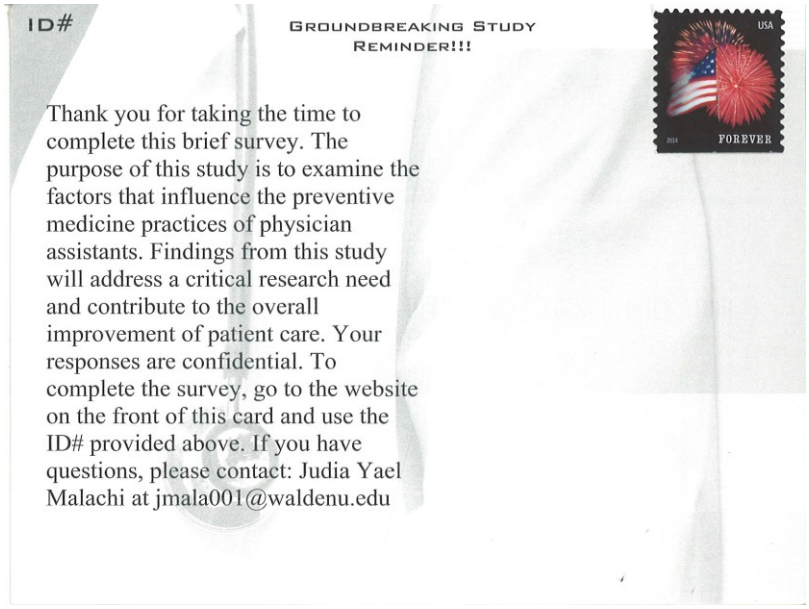
Thank you for your participation!!!

Appendix E: Pilot Study Postcard Reminder

Front:



Back:



Appendix F: 'Thank You' and Incentive Card

Thank you for your participation—*your input is greatly appreciated!*

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