

Bethel University

Spark

---

All Electronic Theses and Dissertations

---

2022

## The Impact of Terminal Doctoral Level Credentials on Physician Assistant/Associate and Physician Collaboration

Alicia Klein  
*Bethel University*

Follow this and additional works at: <https://spark.bethel.edu/etd>



Part of the [Education Commons](#)

---

### Recommended Citation

Klein, A. (2022). *The Impact of Terminal Doctoral Level Credentials on Physician Assistant/Associate and Physician Collaboration* [Doctoral dissertation, Bethel University]. Spark Repository.  
<https://spark.bethel.edu/etd/922>

This Doctoral dissertation is brought to you for free and open access by Spark. It has been accepted for inclusion in All Electronic Theses and Dissertations by an authorized administrator of Spark. For more information, please contact [kent-gerber@bethel.edu](mailto:kent-gerber@bethel.edu).

**The Impact of Terminal Doctoral Level Credentials on Physician Assistant/Associate and  
Physician Collaboration**

by  
Alicia Klein, MS, PA-C

A dissertation submitted to the faculty of Bethel University  
in partial fulfillment of the requirements for the degree of  
Doctor of Education

St. Paul, MN  
2022

Approved by:

Advisor: Krista Soria, PhD

Reader: Gerald Kayingo, PhD, PA-C

Reader: Katrina Schrode, PhD

© 2022  
Alicia Klein, MS, PA-C  
ALL RIGHTS RESERVED

### Abstract

Physician assistants/associates (PAs) are regarded as valuable members of the healthcare team and work in a team-based collaborative model with physicians. In recent years, there has been a debate regarding the most appropriate entry-level and terminal degree for PAs and an urgency to explore optimal team practice. Due to the important collaboration between the collaborating physician (CP) and the PA, how this degree change may impact the quality of relationship is broadly unknown. The purpose of this study was to describe the demographic characteristics of physician assistants/associates (PAs) who have doctoral degrees, describe work-related characteristics of PAs who have doctoral degrees, and identify any association between holding a doctoral degree and PAs' perception of the quality of collaborative relationships with their CP. In this quantitative, retrospective, exploratory study, descriptive statistics and chi-square test of independence were performed using data from the American Academy of Physician Assistants 2021 Salary Survey. Data analysis revealed that there was a significant difference ( $p < 0.05$ ) between demographic and workplace characteristics of PAs with and without doctoral degrees. The PA perception of positive, neutral, or negative relationship with the CP based on whether the PA had a doctoral degree was also statistically significant ( $p < 0.05$ ). Due to limitations, caution should be taken when applying the results of this study toward recommendations in the doctoral degree debate in the PA profession. This study expands the knowledge of clinically practicing PAs with doctoral degrees and how they rate their relationship with their CPs. The results of this study provide professional organizations, healthcare teams, and individual healthcare providers a better understanding of the importance of the cultivation of positive collaborative environments.

Dedication to Matt, Ethan, and Evy.

## Acknowledgments

There are no words to fully express my appreciation for all the support of those around me who have impacted the completion of this dissertation.

First, to my husband Matt, who provided undying support by providing time and space for me to write. To my children Ethan and Evy, who watched me sit at a computer for endless hours in the evening writing “my book,” thank you for loving me as your mom during this time.

To my dissertation committee who cheered me on through emails, zoom calls, and endless mentorship moments. You have sincerely shaped me into the researcher I am today and have cultivated a new found love for research. Your encouragement and guidance directed me to the finish line. To AAPA for supplying me with access to the data that was vital to my study and for connecting me with fellow researchers who supported me on my journey.

To Bethel University for allowing me the opportunity to complete my doctoral degree while being faculty in the PA program. I was unsure what to expect, but when God whispered to me to step forward to complete this degree, I knew the EdD program offered would be of the highest caliber and encourage my faith.

To all my family and friends who prayed for me as I was juggling too many things at once, gave me grace, and supported me throughout.

Above all, I thank God for His whisper to me to learn more about higher education by starting this program, and for sustaining me each and every day. For the mysterious future that awaits me after the completion of this chapter of my journey, I trust the Spirit to guide me.

## Table of Contents

List of Tables .....	9
List of Abbreviations .....	10
Chapter One: Introduction .....	11
Statement of Problem .....	13
Purpose of the Study .....	17
Research Questions and Hypotheses .....	17
Significance of the Study .....	19
Definition of Terms .....	20
Organization of the Study .....	22
Chapter Two: Review of Literature .....	23
Introduction .....	23
The Birth of the Physician Assistant Profession .....	23
Physician Assistant Degree Development .....	26
Physician Assistant Doctoral Degree Debate .....	28
Collaborative Practice and Supervision .....	34
The COVID-19 Impact on the PA Profession .....	38
Theoretical Framework of Collaboration .....	39
Chapter Three: Methodology .....	43
Introduction .....	43
Purpose and Research Questions .....	43
Research Hypotheses .....	44
Research Method and Design .....	44
Research Instrument and Measures .....	45

Survey Respondents .....	45
Variables.....	46
Data Cleaning.....	49
Data Analysis .....	49
Limitations .....	50
Ethical Considerations.....	51
Chapter Four: Results .....	53
Introduction.....	53
Research Questions .....	53
Response Rate .....	54
Research Question One .....	55
Research Question Two .....	58
Research Question Three .....	64
Results Summary.....	66
Chapter Five: Discussion .....	68
Overview of the Study.....	68
Research Questions .....	68
Major Findings and Implications .....	69
Research Question Three .....	79
Limitations and Cautions of Application .....	82
Significance of Results.....	83
Recommendations for Additional Research.....	84
Conclusion.....	86



References.....	87
Appendix A.....	102
Appendix B.....	103

**List of Tables**

1: Age of PAs with and without a Doctoral Degree ..... 56

2: Gender of PAs with and without a Doctoral Degree ..... 57

3. Race and Ethnicity of PAs with and without a Doctoral Degree..... 58

4: Primary Role of PAs with and without a Doctoral Degree..... 59

5: Leadership Role of PAs with and without a Doctoral Degree..... 60

6. Primary Setting of PAs with and without a Doctoral Degree ..... 60

7: Primary Specialty PAs with and without a Doctoral Degree..... 61

8: Number of Years as a PAs with and without a Doctoral Degree ..... 62

9. Years at Current Employer of PAs with and without a Doctoral Degree..... 62

10: Percent Time Spent Consulting with CP among PAs with and without a Doctoral Degree .. 63

11: Perception of Impediment in Collaboration Agreement during COVID-19 Pandemic among PAs with and without a Doctoral Degree ..... 64

12. Positive, Neutral, or Negative Rating Relationship between CP and PA among PAs with and without a Doctoral Degree ..... 66

**List of Abbreviations**

AAPA	American Academy of Physician Assistants
AMA	American Medical Association
CP	Collaborating Physician
CT	Collaboration Theory
OTP	Optimal Team Practice
PA	Physician Assistant/Physician Associate
PAEA	Physician Assistant Education Association

## Chapter One: Introduction

Physician assistants/associates (PAs) are versatile medical health care practitioners who provide high quality patient care and are trained to diagnose and treat patients (American Academy of Physician Assistants, [AAPA], 2019a). The PA profession is one of the fastest growing healthcare careers in the United States, growing 28.7% between 2017 and 2021, reaching 158,470 PAs at the end of 2020 (National Commission on Certification of Physician Assistants, [NCCPA], 2022a). The PA profession has a projected 31% increase from the year 2020 to 2030 (U.S. Bureau of Labor Statistics, 2022). A predictive model based on four data sources projects the 2035 census of clinically active PAs to be between 204,000 and 214,000: a growth rate of approximately 35% (Hooker et al., 2022). When PAs are included in healthcare teams, there are positive economic benefits to society, patient care, and to the healthcare team (Cawley et al., 2012; Crafts et al., 2022; Hooker, 2022). The global movement of the PA profession includes adaptations of PA education in other countries and the increased use of PAs and similar health-professions to meet the needs of local communities (Ballweg & Hooker, 2017; Rick & Ballweg; 2017).

Currently, the educational degree credential offered to students seeking to become PAs is a master's degree, which presently serves as the entry-level and terminal degree in this field (AAPA, 2019; Accreditation Review Commission on Education for Physician Assistants, [ARC-PA], 2022; PAEA, 2022). Despite the master's degree being proven to be sufficient for excellent PA patient care and satisfaction, there is debate regarding a potential transition to entry-level and terminal doctoral degree credentials (PAEA, 2022). The degree debate is driven by multiple factors: The current cost and length of PA training is already consistent with non-physician doctoral training, and other healthcare professions have recently moved to an entry-level doctoral

degree (AAPA, 2019; PAEA 2022). The current PA degree debate involves both exploring the entry-level doctoral degree at the PA program training level and considering a terminal-doctoral degree recommendation.

The PA profession is largely divided regarding the potential move to a doctoral degree, and very few research studies have been conducted surrounding the topic of adding or requiring a doctoral degree for PAs (Kibe et al., 2020). Supporters of the doctoral degree propose that it may provide competitive hiring compared to doctoral-trained nurse practitioners in addition to potential leadership opportunities (Brown et al., 2021; Kulo et al., 2021). Opponents to a degree change vocalize concerns in negatively impacting diversity within the profession, straining the relationship between PAs and physicians, and overall unclear benefits to the change (Fleming et al., 2021; Kulo et al., 2021; O'Connell et al., 2020).

Recently, leaders, policymakers, and educators working in the field of PA education have debated changing the terminal degree from a master's degree to a doctoral degree; however, little is known about how this new direction of the PA profession may impact the collaborative relationship between physicians and PAs. PAs work within a team-based model in which they practice medicine with a collaborative physician (CP). The CP and PA relationship is a key feature of the PA profession that needs to be considered before transitioning to a terminal doctoral degree for PAs (Gordes et al., 2022). If PAs change to a doctoral degree, there are concerns that the shift will strain and negatively impact the relationship between CPs and PAs, which could in turn impact patient care and the healthcare team dynamic (Kulo et al., 2021; O'Connell et al., 2021). The potential negative impact of a PA doctoral degree on the CP-PA relationship is based upon stakeholders' perceived concerns and perceptions. If stakeholders' overall perception is the doctoral degree would cause more harm than good, then they are more

likely to rate a negative impact to the CP-PA relationship with an entry-level doctoral degree (Kulo et al., 2021).

Since its inception in the 1960s, the PA profession is largely based upon team-based practice through collaborative relationships with CPs and others in the healthcare field. Cultivating positive and strong team culture among clinicians protects against exhaustion and burnout (Knox et al., 2018; Willard-Grace et al., 2014). Burnout, and the intent to leave the medical field, is a threat to the healthcare system; however, collaborative relationships positively influence professional outlook and satisfaction and thus may protect employees against burnout or work dissatisfaction (Essary et al., 2018). If working in collaborative team-based settings protects against burnout, maintaining and cultivating positive relationships between CPs and PAs is imperative. As the PA profession weighs the potential impact of changing to a doctoral degree, specific attention to the CP and PA relationship should be considered. Identifying the quality of CP relationships with PAs who hold a doctoral degree can provide insights regarding the implication of a potential doctoral degree for PAs.

### **Statement of Problem**

The healthcare field has seen massive rates of burnout and turnover since the onset of the COVID-19 pandemic, with 18% who have quit their jobs, 12% who were laid off, and 31% who have considered leaving (Galvin, 2021). In 2021, 30.6% of PAs reported symptoms of burnout with 40.2% of PAs considering leaving their principal clinical position (NCCPA, 2022a). Burnout of medical providers impacts the quality of patient care leading to decreased patient satisfaction, increased medical errors, and negative patient experiences (De Hert, 2020). PAs who leave their jobs are most likely to leave to improve their work-life balance or to leave a toxic work environment (Reed et al., 2021). PA turnover is expensive for employers and may

cost up to 200% of PAs' annual salary (Reed et al., 2021). Notably, the most recent estimates suggest that up to 15,000 PAs are considering leaving their jobs due to stress, which will negatively impact the quality of patients' care (Blackstone et al., 2021).

Some potential protective influences against PAs' burnout include team-based working models, teaching, and expanding PAs' role in the clinic or hospital setting (Blackstone et al., 2021). The PA profession is based upon a team-based model and positive team culture is protective against exhaustion and burnout (Knox et al., 2018; Willard-Grace et al., 2014). Similarly, low satisfaction with physician supervision is associated with burnout (Bell et al., 2002). Positive team culture is not only important to reduce burnout but also results in improved patient outcomes, career engagement, and the cultivation of clinical skills (Essary et al., 2018; Nishi et al., 2022). Since PAs work in a team-based model with a CP, the cultivation of this relationship is important for not only the PA profession, but also for the interprofessional healthcare team and patient care outcomes, which lends itself to the question, will a change in the terminal degree of PAs positively or negatively impact the quality of healthcare provider teams?

A move to an entry-level doctoral degree has occurred in recent years in multiple healthcare disciplines, including nurse practitioners, pharmacists, and physical therapists (Miller & Coplan, 2017). The process of degree changes in other health professions paves the way for PAs to consider the risks and benefits of a degree change (Gordes et al., 2022). PAs are the only clinical practitioners with prescribing authority who do not have a profession-specific doctoral degree option (Kayingo & Hass, 2017). Specifically, in 2020, the Physician Assistant Education Association (PAEA, 2020b) called for research that would inform the policy recommendations moving forward and investigate a PA doctoral degree.

Stakeholders have vocalized concerns regarding the PA doctoral degree largely based on

the significance of unknown variables (Kibe et al., 2020). PAs have historically been practicing clinically with patients under the supervision of a physician, known as a supervisory or CP. At the core, the CP-PA team relationship is the foundation of the PA profession that allows PAs to be adaptable on healthcare teams (Hass, 2016). Over time, PAs have widened their scope of practice and become autonomous, lending themselves to a collaborative working relationship with CPs in the last decade (AAPA, 2019b). If the PAs change to a doctorate degree, PAs have expressed concerns that the shift will strain and negatively impact the relationship between CPs and PAs (Kulo et al., 2021; O'Connell et al., 2020).

Major stakeholders in the discussion of a potential PA degree change include PAs, physicians, educational leaders at higher institutions, and PA employers. The perception of risks and benefits of the degree change is primarily influenced by the lens of stakeholders (Kulo et al., 2021). As national leaders pursue policy improvements and professional advocacy, the AAPA should work alongside the AMA to maintain the positive team-based healthcare relationship between CPs and PAs. The motivation behind the PA degree change is unclear, although the transition of other health professions to an entry-level doctoral degree likely has had an impact on this debate. Specifically, how the doctoral degree may impact the healthcare team and the relationship between PAs and CPs is unknown.

A change to a doctoral degree in the PA profession may impact the demographic composition of the profession, which already contains several known disparities. PA profession demographics have largely remained unchanged over many decades despite efforts to diversify the profession through PA education competencies. People of color are largely underrepresented in the PA profession (Smith & Jacobson, 2016). There are concerns that the doctoral degree would further negatively impact diversity in the PA profession (Fleming et al., 2021; Kulo et al.,



2021). Although the PA profession is made up of a majority of women, they have disproportionately lower salaries than men in the profession (McCall & Smith, 2020). If the PA profession moves to a doctoral degree, the impact of demographic disparities should be evaluated and considered.

PAs hold great potential to take on more leadership roles due to the team-based training they have received (Bernard & McMoon, 2019). PA leaders who have influential physician mentors are more likely to experience professional advancement and job satisfaction (Louwagie et al., 2022). Very little research exists around the CP-PA relationship and further exploration is needed to understand the potential impact a PA doctoral degree may have on PA leadership roles.

According to the National Commission on Certification for Physician Assistants (NCCPA) 2021 annual report, 2% of 127,431 PAs hold a doctoral degree. This is slightly increased from 1.6% of PAs in 2016 (NCCPA, 2022a). Comparatively larger percentages of PAs in education hold doctoral degrees. According to the PAEA (2020a) report, 23.5% of PA faculty, and 45.5% of PA program directors hold a doctoral degree. Historically, a required entry-level doctoral degree for PAs has been largely opposed by medical doctors, practicing PAs, and PA students (Coplan et al., 2009; Muma et al., 2011; Ohlemeier & Muma, 2008; Swanchak et al., 2011). However, recently there was a shift to mixed or supportive responses to a PA doctoral by PA students (Menezes et al., 2015).

Currently, the options for doctoral degrees for PAs include clinical doctorates and post-professional doctorates (Kayingo & Hass, 2017). In 2020, most PAs with doctoral degrees had specific degrees as PhD, DMSc, MD, and DHSc (NCCPA, 2021). The PA profession does not currently have any programs that offer an entry-level doctoral degree, as the PAEA currently

supports the entry-level master's degree and supports PAs to pursue post-doctorate degree options if desired (PAEA, 2020a). Attempts to launch entry-level doctorates by some institutions have met accreditation and logistical challenges as ARC-PA is not authorized to accredit doctoral level education (ARC-PA, 2022). Given the trend in other healthcare professions earning doctoral degrees, it has become increasingly important to examine the impact a degree change may have on the PA profession on the relationship between PAs and CPs.

### **Purpose of the Study**

There are existing demographic disparities in the PA profession and a required or added doctoral degree may contribute to further demographic disparities; therefore, the first purpose of this study is to examine whether there are demographic differences between PAs who do and do not have doctoral degrees. Further, little is known about the impact of doctoral degrees on PAs' work-related experiences (e.g., primary role and setting, serving as a leader in an organization); therefore, the second purpose of this paper is to examine whether there are differences in the work-related experiences of PAs who do and do not have doctoral degrees. Although collaborative relationships between PAs and CPs are important to prevent PAs' burnout and attrition, there is little information about the potential effects of a doctoral degree on PAs' collaborative relationships with their CPs. As a result, the third and final purpose of this paper is to examine whether there are significant differences between PAs' perception of the quality of collaborative relationships with CPs by whether PAs have a doctoral degree.

### **Research Questions and Hypotheses**

This study investigated the following research questions:

RQ1: Is there a statistically significant ( $p < 0.05$ ) difference in demographic characteristics (i.e., age, gender, race/ethnicity) between PAs who do and do not have a doctoral

degree?

H01: No differences exist between demographic characteristics of PAs with doctoral degrees compared to those without a doctoral degree.

HA1: Significant differences exist between demographic characteristics of PAs with doctoral degrees compared to those without a doctoral degree.

RQ2: Is there a statistically significant ( $p < 0.05$ ) difference in work-related factors (i.e., primary role, leadership role, primary workplace setting, primary specialty, length of time as a PA, years at current employer, percent time consulting CPs, CP policies during COVID-19 pandemic) between PAs who do and do not have a doctoral degree?

H02: No differences exist between work-related factors between PAs with doctoral degrees to those without a doctoral degree.

HA2: Significant differences exist between work-related factors between PAs with doctoral degrees to those without a doctoral degree.

RQ3: Is there a statistically significant ( $p < 0.05$ ) difference in PAs' perception of positive, neutral, or negative collaborative relationships with CPs between PAs who do and do not have a doctoral degree?

H03: No differences exist between PA perception of their CP collaborative relationship and PAs with or without a doctoral degree.

HA3: Significant differences exist between PA perception of their CP collaborative relationship and PAs with or without a doctoral degree.

The hypotheses were developed on the basis of existing research; for instance, the PA profession has a majority of White females and a doctoral degree may lend itself to increased males and decreased racial diversity in the PA workforce (Fleming et al., 2021; Kulo et al., 2021,

Togioka et al., 2022). Power struggles in the hierarchy of medical teams may hinder the fostering of positive relationships and thus a more negative relationship with CPs may be perceived by PAs who have doctoral degrees (Vanstone & Grierson, 2022). A PA doctoral degree may also lend itself to increased leadership positions (Kulo et al., 2021). PAs working in PA education may further be more likely to have a doctoral degree due to the favor of institutions to doctoral degrees (Kayingo, Gordes, & Jun et al., 2021).

### **Significance of the Study**

The COVID-19 pandemic has placed tremendous stress on the U.S. healthcare system, with more than 83 million infections and 1 million deaths (Center of Disease Control and Prevention, 2022). In response to the pandemic, PAs have been key members of the healthcare workforce who have responded as hospitals reallocated resources and staff to meet the needs of patients (Westry et al., 2022). In addition to the global physical impact of COVID-19, the negative impact on healthcare workers' mental health has been significant (Hall, 2020; Westry et al., 2022). Healthcare workers on the frontlines face tremendous challenges and stress on their mental health due to a shortage of workers and high patient volumes (Hall, 2020).

PAs have had a significant response to the pandemic by responding to the need for healthcare providers. PAs are some of the most flexible medical providers due to the training education model; yet, barriers to optimal team practice (OTP) created limitations in using PAs to their full scope during COVID-19 (McGrath et al., 2021; Westry et al., 2020). The importance of PAs in healthcare teams was well established prior to 2019 and, since the COVID-19 pandemic, the value of PAs toward patient care, community health, and healthcare systems has been clearly demonstrated (McGrath et al., 2021). Further exploration into variables of training and the CP-PA relationship will potentially support the distressed healthcare workforce and impact the well-

being of the community.

There are several new developments in the PA profession including policies of OTP, a name change to physician associate, and debate over offering a terminal degree for PAs. All these topics share a common thread of identifying and reflecting that PAs are valued medical providers on the healthcare team providing excellent patient care. The PA profession historically started as an extension of a CP, working under supervision and collaboration together. As the PA profession expanded its role over the past decades, the relationship with the CP has started to change with OTP and the release of physicians from administrative constraints and burdens (AAPA, 2022). The scope of practice of a PA is governed at state level and only a small fraction of states so far have implemented OTP (AMA, 2018; Valentin et al., 2020).

Currently, there is a lack of research that specifically addresses the perceived relationship between PAs and CPs in relation to the PA doctoral degree. Understanding the perceived relationship between PAs and CPs, specifically PAs with doctoral degrees, will shed light on the impact a widespread degree change may have on the medical provider team dynamics between PAs and CPs. This research will help inform the ongoing doctoral degree discussions in the PA profession which has implications for the general healthcare workforce worldwide.

### **Definition of Terms**

American Academy of Physician Assistants (AAPA): The national professional society for physician assistants.

Collaborative physician (CP): The licensed physician who provides supervision or collaboration with a physician assistant. The nature and specifics of the relationship varies by state based on regulations and optimal team practice.

Collaborative physician relationship: the quality of the relationship between a PA and a

CP, as perceived by PAs.

**Collaboration:** The PA profession endorses the term collaboration as the modern description of the PA/CP relationship (AAPA, 2016). The relationship between PAs and CPs may be described as supervisory or collaborative, which varies based on state legislature.

**Entry level degree:** The entry level degree is offered by accredited PA programs designed to train PA students in acquiring the knowledge and skills needed to enter the PA profession. Currently, the entry level degree is a master's degree which serves as the entry-level and terminal degree for the profession (PAEA, 2021).

**Optimal team practice (OTP):** A healthcare model in which administration constraints are removed from the physician in a team-model working with physician assistants (AAPA, 2022).

**Physician assistant (PA):** Licensed clinicians who practice medicine in a team-based, patient-centered healthcare model. PAs work in a variety of settings including clinics, hospitals, surgery, family practice, pediatrics, psychiatry, and every specialty. The name physician assistant is interchangeable with the name change to physician associate in 2022.

**Physician associate (PA):** An interchangeable term for physician assistant. Acknowledged by the AAPA as the new official name of the physician assistant in 2022.

**Supervision:** A term to describe the PA/CP relationship which includes the overseeing of PA activities and the CP accepting responsibility for the medical services rendered by a PA. The American Medical Association utilizes the term supervision when describing the PA scope of practice (AMA, 2018). The relationship between PAs and CPs may be described as supervisory or collaborative, which varies based on state legislature.

**Terminal degree:** The highest academic degree in a field or profession. Currently, the terminal degree for the PA profession is a master's degree (PAEA, 2021). PAs may pursue

postgraduate doctorate-level education for advancement in their careers

### **Organization of the Study**

In this quantitative retrospective study, existing AAPA survey data were obtained from the annual AAPA Salary Survey (AAPA, 2021) for analysis to address the research questions for this study. The data used in this study were collected by AAPA through surveys of the national PA population February 1, 2021 to March 1, 2021 and provide a comprehensive view of the PA workforce.

In the remaining sections of this dissertation, Chapter 2 will explore current literature on the historical origins of the PA profession, evolution of degree changes for PAs, unique nature of the CP relationship with PAs, and current debate for the PA terminal degree. Chapter 2 also includes the theoretical framework of collaboration. Chapter 3 will describe the methodology of the study, including limitations and ethical considerations, followed by results in Chapter 4. Finally, Chapter 5 will include a discussion of the results and recommendations for future investigation.

## **Chapter Two: Review of Literature**

### **Introduction**

The first chapter of this study provided background information to the problem of the importance of the quality of relationship between physician assistants/associates (PAs) and collaborating physicians (CPs) in determining the proper terminal degrees for PAs. This chapter synthesizes current literature on the historical origins of the PA profession, evolution of degree changes for PAs and other healthcare professions, current debate for the PA terminal degree, the unique nature of the CP relationship with PAs, COVID-19 impact on the PA profession, and the theoretical framework of collaboration.

### **The Birth of the Physician Assistant Profession**

To understand how the PA profession has developed to its current state, an overview of the history of the PA profession, professional associations, and education is imperative. In the 1960s, the United States sought to train a new type of healthcare provider to meet the growing need of supplying and distributing primary healthcare providers (Cawley, 2007). The leaders and forerunners of the first PA programs had specific visions when they envisioned and launched the first PA programs (Cawley, 2007). Four physicians took it upon themselves to create a new model of medical school to sponsor the training of a new form of healthcare professionals.

Initially, PAs often worked with one physician in a small area of rural primary care medicine, which required direct supervision of the PA under a physician, and there were no research studies or documented evidence of the quality of healthcare provided by PAs (AAPA, 2016). During this time, PAs were not allowed to write prescriptions or work autonomously. These aspects of the position and the evidence pointing to the quality of healthcare provided by PAs have now significantly changed, with an abundance of studies now showing PAs provide



excellent, high-quality care healthcare to patients with positive patient outcomes comparable to that of physicians (Everett et al., 2020; van den Brink et al., 2021).

The early vision of the healthcare role of a PA first had many different names including health assistant, health associate, physician assistant, nurse practitioner, surgeon assistant, clinical associate, and many others (Cawley, 2007). The pioneer leaders of the PA profession perceived this new type of medical provider would bridge the gap in primary care and serving rural communities (Cawley, 2007). Broadly, the PA profession met this goal as PAs now provide healthcare to underserved areas as well as meet the general healthcare needs of society as medical providers (Coplan et al., 2017). As the new PA healthcare profession emerged, there was subsequent development in PA schools, accreditation agencies of the PA profession, accreditation agencies of PA programs, and supportive associations for PA educators.

The first PA programs were established in various academic medical centers. Duke University housed the very first PA program, which was designed to be an abbreviated medical school degree with completion in 2 years of training (Cawley et al., 2012). As of 2022, there are 287 accredited PA programs in the U.S. graduating over 10,000 PAs each year (Accreditation Review Commission on Education for Physician Assistants, 2022). In addition to leaders of the birth of the PA profession and programs, PA education leaders began to establish supportive organizations to ensure quality and support of the profession. Founded in 1972 as the Association of Physician Assistant Programs, the professional organization that represents PA education programs is now known as the Physician Assistant Education Association (PAEA; Asprey & Barwick, 2017). PAEA was established with the goal to pursue excellence, foster faculty development, advance knowledge toward patient-centered care, and promote diversity in PA education (Asprey & Barwick, 2017).

The accrediting agency of PAs, called the National Commission on Certification of Physician Assistants (NCCPA), was established in 1974 to ensure the development of skills and measure clinical competency of PAs (Hooker et al., 2004). The NCCPA administers the certifying exam that all PAs must pass to be a qualified clinician after graduating from an accredited PA program. This exam, called the Physician Assistant National Certifying Exam (PANCE), was first administered in 1973, and has since been taken by over 150,000 PAs (NCCPA, 2022a). The NCCPA Content Blueprint is a list of topics and competencies identified as minimum clinical problems a PA should understand to enter primary care practice (Hooker et al., 2004). The blueprint is used in the construction of the PANCE and is used as the topics of instructions by PA programs.

The accrediting body of PA programs is an organization called the Accreditation Review Committee on Education for the Physician Assistant (ARC-PA). The ARC-PA protects the interests of the public and PA profession by defining the standards for PA education and evaluating PA educational programs (McCarty et al., 2001). Compliance with accreditation standards is required for programs to remain accredited and in good standing to successfully graduate PA students.

The method of training of PAs includes a competency-based education model and a degree-based system (Cawley, 2007). Since the 50 years of its inception, the PA school system in its current iteration successfully trains effective generalist clinicians who provide high quality patient care with high rates of patient satisfaction (AAPA, 2019). PAs provide patient care that is equivalent to physicians and nurse practitioners (Everett et al., 2020). Due to the required competencies for PA training, most PA programs are similar in their model of instruction, regardless of the programs' age (Quincy & Synder, 2020).

Generally speaking, PA programs have two phases of education design: a didactic phase and a clinical phase (AAPA, 2019). PA programs are formed around a common goal to have all graduates successfully demonstrate core competencies (Cawley, 2007). According to the PA program accreditation standards, programs must provide instruction to teach students how to achieve demonstration of these competencies (McCarty et al., 2001). The traditional didactic phase of face-to-face instruction includes biological sciences and clinical medicine and 75% of programs use lecture-only educational methods (Hills et al., 2020). The traditional clinical phase includes 4-8 week rotations in clinics and hospitals, including family medicine, emergency medicine, surgery, pediatrics, and women's health (AAPA, 2019). All training at accredited institutions results in a final degree for the PA; however, that degree has shifted over time.

### **Physician Assistant Degree Development**

To understand the debate surrounding the entry-level and terminal degree for physician assistants/associates (PAs), a brief overview of the historical context of PA degrees must be reviewed. At the birth of the PA profession, PAs were designed to enter the healthcare field as soon as possible after adequate training and thus were simply awarded a certificate without a formal degree (Cawley, 2007). In 1970, the first degree was awarded to a PA program as an academic degree and over time most programs awarded a bachelor's degree (Cawley, 2007). The standards set by the national accreditation body for PAs in 2001 recognized the need not only ensure high quality education to equip PAs for patient care but also modified the standards in 2005 to require all programs award a minimum of a bachelor's degree to reflect the graduate level rigor of the PA curriculum (Cawley, 2007).

The degree shift from certificate to bachelor's was trending and shortly after, the shift toward a master's degree occurred for PAs. The shift from a bachelor's degree to a master's

degree occurred due to the rigor of the PA degree being beyond that of a typical bachelor's degree, as well as many interested in the profession already having obtained a bachelor's degree (Cawley, 2007). The average credit load for a master's PA program is 104 credits, which is double that of a typical master's degree credit load (Miller & Coplan, 2017). In the year 1990, only three PA programs (6%) awarded a master's degree and by 2007, 108 of 136 programs (79%) of all programs awarded a master's degree (Cawley, 2007; Jones 2007). The shift in degree occurred due to national PA governing bodies recommending that all PA programs move to a master's degree and by the year 2020, all matriculating students in accredited PA programs will complete a master's-level degree (AAPA, 2019; Miller & Coplan, 2017). The type of master's degree awarded varies as the national associations do not require a specific form of master's degree, and the most common degree is Master's of Physician Assistant Studies (Cawley, 2007). The master's degree is currently the terminal degree, and minimum entry-level degree, for the PA profession

Almost immediately after the change to a master's degree, discussions about an entry-level or terminal doctoral degree began to occur in PA academia and national associations. In 2009, the AAPA and PAEA gathered in a doctoral summit to obtain input from various stakeholders in the terminal degree debate and ultimately recommended against an entry-doctoral degree while supporting PAs who chose post-professional training (PAEA, 2009). At this time, PAEA continued to endorse the master's degree as the appropriate and sufficient terminal degree for the PA profession. Despite this recommendation, the conversation and debate surrounding a possible entry-level doctoral degree continued for 2 decades (Jun et al., 2022).

PAEA continued to convene stakeholders in doctoral summits over time, and in 2020 requested research studies surrounding the impact and perception of the entry-level doctoral

degree for PAs (PAEA, 2020b). After reviewing the studies, PAEA's policy in 2021 continued to support the master's degree as the entry-level and terminal degree for PAs, while continuing to support PAs who pursue postgraduate doctorate-level training (PAEA, 2021). In 2023, PAEA will host a doctoral summit to discuss with a multitude of stakeholders if PA education should shift to awarding a doctoral degree as the entry-level degree for the profession (PAEA, 2022).

The progression of the PA degree from a certificate to the debated entry-level doctoral degree is similar to the degree changes that have occurred in other healthcare professions. The rise of medical field professions moving toward an entry-level doctoral degree include nurse practitioners, pharmacists, and physical therapists (Kibe et al., 2020). The transition to award an entry-level-doctorate degree for these professions took 50 years for pharmacy, 22 years for physical therapy, and 14 years for nurse practitioners (Kibe et al., 2020). The American Association of Colleges of Nursing (AACN) endorsed the Doctor of Nursing Practice (DNP) as the single entry degree for advanced practice nurses beginning in 2015. These transitions have placed pressure on PAs to consider a doctoral degree (Miller & Coplan 2017).

### **Physician Assistant Doctoral Degree Debate**

The master's degree for PAs is sufficient for excellent patient care and satisfaction, so the question of the doctoral degree has considerable debate (AAPA, 2019). Currently, the entry level degree is a master's degree which serves as the entry-level and terminal degree for the profession (PAEA, 2021). The terminal degree is the highest level of degree obtainable in a field or profession, and there is not an additional doctoral degree specific for the PA profession. PAs may pursue postgraduate doctorate-level education for advancement in their careers, however the terminal degree for PAs remains the master's degree (PAEA, 2021).

Several health professions have single entry-level doctoral degrees, and some have a

variety of options. Public health practice covers many degrees, most often the master's in public health and different doctoral degrees such as a doctor of public health (Doctor of Public Health Coalition, 2022). Nurse practitioners, physical therapists, and pharmacists offer entry-level professional doctorate programs, and their national organizations have standardized the programs (Kibe et al., 2020). The accreditation review commission on education for the PA offers voluntary, clinical postgraduate accreditation standards, to programs who offer structured education (ARC-PA, 2022). Clinical postgraduate programs for PAs are encouraged by the profession as an option for career advancement, however the master's degree is the supported terminal degree for the profession (PAEA, 2020a).

Historically, a required entry-level doctoral degree for PAs has been largely opposed by medical doctors, practicing PAs, and PA students (Coplan et al., 2009; Muma et al., 2011; Ohlemeier & Muma, 2008; Swanchak et al., 2011). However, recently there has been a shift to mixed or supportive responses to a PA doctoral by PA students (Menezes et al., 2015). The PA profession is largely divided toward moving to a doctoral degree, and very few research studies have been conducted addressing the topic of a doctoral degree for PAs (Kibe et al., 2020). Specifically in 2020, PAEA called for research that would help inform the policy recommendations moving forward and investigate a PA doctoral degree (PAEA, 2020b). PAEA stated they would continue to endorse the terminal master's degree for PAs and called for additional research for the PA doctorate (PAEA, 2020a).

As the master's degree is the recommended terminal degree for PAs, there is not one specific doctoral degree endorsed by AAPA or PAEA. Currently, the options for doctoral degrees for PAs include clinical doctorates and post professional doctorates (Kayingo & Hass, 2017). In 2020, most PAs with doctoral degrees had specific degrees such as PhD, MD, EdD,

DMSc, and DHSc (NCCPA, 2021). The PA profession does not have any programs at present that offer an entry-level doctoral degree, as the PAEA currently supports the entry-level master's degree and supports PAs to pursue post-doctorate degree options if desired (PAEA, 2020a). According to the National Commission on Certification for Physician Assistants (NCCPA, 2022a) annual report, 2% of the 133,905 PA respondents (overall response rate of 84.5%) hold a doctoral degree. Comparatively larger percentages of PAs who work in PA education hold doctoral degrees. According to the PAEA (2020a) report, 23.5% of PA faculty, and 45.5% of PA program directors hold a doctoral degree.

The motivation behind the degree change is varied and has multiple factors in the perception of motivation. The motivation and perception of a doctoral degree is dependent on each specific individual (Kulo et al., 2021). Overall, the support and interest in a doctoral degree for PAs currently is mixed and contradictory. There are many vocalized concerns of different stakeholders regarding the doctoral degree largely based on the significant number of unknown variables (Kibe et al., 2020). Many of the studies published on the perceptions of the doctoral degree have utilized non-validated survey tools (Jun et al., 2022). A valid and reliable self-reported instrument to assess perceptions from various stakeholders in the entry-level PA doctoral degree is key in understanding the doctoral degree debate (Jun et al., 2022).

Several factors surrounding the doctoral degree debate include perceptions of competitive hiring practices, potential leadership positions, impact of PA profession demographics, and influences of workplace settings.

### ***Competitive Hiring***

Some PAs believe a doctoral degree allows for competitive hiring compared to doctoral-trained nurse practitioners (Brown et al., 2021; Kayingo et al., 2021). Kulo et al. (2021) similarly

found that a perceived benefit of PA doctoral degrees is competitive jobs and hiring equality. The association between job requirements and degree has largely remained unanswered, and new research has started to uncover if doctoral degrees are preferred for PA jobs. Several factors that weigh heavily in the terminal degree debate include the change of physician supervision role to a collaborative relationship, increased PA school credit loads and tuition cost, and competition of job openings with other healthcare practitioners (Miller & Coplan, 2017).

### ***Leadership Potential***

It is unknown whether doctoral degrees offer potential for increased leadership opportunities for PAs in clinical positions. PAs are well situated to be leaders in their field and are a growing voice in leadership as they take on leadership roles in education, research, and administration (Louwagie et al., 2022; Kibe et al., 2022). This mixed response has led to the question regarding a degree change for PAs: Will the doctorate degree lend itself to an increase in leadership positions or indicate a level of leadership with potential employers? An entry-level doctoral degree may encourage earlier leadership positions for PAs, which may be a motivating factor to pursue a doctoral degree (Miller & Coplan, 2022). Leadership roles in PA programs and a doctoral degree are also associated with about half of program directors at PA programs holding doctoral degrees (Quincy & Snyder, 2020). The role of clinical leadership and an entry-level PA degree is a potential perceived benefit if the PA profession changes to a terminal doctoral degree.

As positive team-based models have already been shown to be imperative in the prevention of burnout, likewise the leadership development may impact PAs' burnout (Bernard & McMoon, 2019). It is possible that the doctoral degree may lend itself for PAs to increase their leadership positions in academic, research, and policy-making administration positions (Kulo et



al., 2021). Increasing the PAs' perspective and voice into leadership positions would introduce another perspective. In fact, Kulo et al. concluded that the potential for leadership opportunities were in the top three positive impacts a doctoral degree would have for the profession.

Since the master's degree is the terminal degree at the time of this writing, pursuit of further degree education by a PA may be motivated by their desire to expand their knowledge or to increase leadership skills and opportunities. In 2021, 5.2% of PAs pursued a postgraduate residency or fellowship with 23.6% in emergency medicine and 15.1% in general surgery (NCCPA, 2022a). Residencies and fellowships for PAs do not generally award doctoral credentials, but it may imply which areas of clinical medicine PAs are interested in obtaining additional knowledge or skills after the master's degree. Very little research has been conducted on primary clinically practicing PAs and their pursuit of doctoral credentials.

### ***Demographic Impact***

Increased diversity in healthcare professionals is associated with positive healthcare outcomes (Ackerman-Barger et al., 2022; Bradley-Guidry et al., 2022; Hilton et al., 2020; Kayingo et al., 2022). The debate toward a change to a doctoral degree has elevated concerns that the doctoral degree would further negatively impact diversity in the PA profession (Fleming et al., 2021; Kulo et al., 2021). The PA profession already has disproportionately low percentages of PAs of color with 80.6% identifying as White and thus the risk of widening that gap is an important concern (NCCPA, 2022a). In one study, 67% of respondents stated that the doctoral degree would likely negatively impact diversity (Fleming et al., 2021). The retention of providers who are underrepresented in medicine is vital to the health and wellness of the broader community, especially underserved patient populations (Togioka et al., 2022). As the U.S. becomes an increasingly multicultural and diverse society, the PA workforce must reflect that

diversity to best serve patients.

Additional PA demographic considerations include the gender gap in the profession. The PA profession is largely female (70.1% identify as female; NCCPA, 2022a). Men are more likely to experience professional advancement, have an increased academic rank, and hold various leadership positions in the physician and nursing professions (Togioka et al., 2022). As the PA profession continues to have a female-majority healthcare workforce, the impact a doctoral degree may have on gender disparities needs further exploration.

### ***Workplace Settings***

In academia, a doctoral degree is highly valued by institutions. PA faculty job postings favor a doctoral degree which likely is connected with the academic culture of higher education institutions (Kayingo et al., 2021). As higher education leaders and administrators are important stakeholders in a degree-change for PAs, national organizations will need to clearly address how the transition toward a doctoral degree would impact PA programs. The investment and development of a doctorate program for higher education institutions will include the potential for changing PA curriculum as well as advancing the degrees of PA faculty who are largely master's-degree trained (Kayingo et al., 2021).

In 2021, the percent of all PAs in the U.S. who held doctoral degrees was 2.1% which was an increase of 1% from 2020 (NCCPA, 2022a). The percent of doctorally credentialed PA educators are higher overall with 23.5% of faculty and 45.5% of program directors (PAEA, 2020). This difference may be attributed to the large demand, and preference, for PAs to have a doctoral degree if they are working in higher education (Kayingo et al., 2021). PA educators may decide to pursue a doctoral degree based upon their pursuit of tenure, to be competitive in hiring, or to pursue leadership roles in education (Kayingo et al., 2021; Valentine, 2019). However, it is

currently unclear what type of doctoral degree is most appropriate for PA educators, and if there is a true return of investment of the time and financial resources spent toward the degree (Kayingo et al., 2021).

Educators are more supportive of a doctoral degree compared to clinical practicing PAs (Kulo et. al., 2021). Kibe et al. (2018) suggested that universities are likely the driving force behind doctorate credentials for PAs. However, the majority of PA educators are neutral or opposed to the doctoral degree (Brown et al., 2021). Diallo and Noller (2020) interviewed a small group of PA program directors, half of whom were supportive and half who were opposed to an entry-level doctoral degree. While it is known that PAs with a role in education are potentially more likely to pursue a doctoral degree based on institutional preferences, it is largely unknown if PAs working primarily in a clinical role hold doctoral degrees.

PAs practice medicine in a large array of settings and specialists. The most common practice areas and positions for PAs are surgical subspecialties (18.7%), family medicine/general practice (17.7%), emergency medicine (11.8%), and internal medicine subspecialties (9.7%; NCCPA, 2022a). Most PAs worked in a hospital (41.6%) and office-based private practice (37.4%). When asked about factors influencing their intent to leave, 6.7% of PAs stated the desire to pursue additional education as a factor (NCCPA, 2022a). There is a lack of research surrounding the settings and specialists PAs with doctoral degrees currently work.

### **Collaborative Practice and Supervision**

PAs have historically been practicing clinically with patients under the supervision of a medical doctor (MD/DO) in the historical model. At the core, the collaborative Physician-PA team relationship is the foundation of the PA profession which allows the PA to be adaptable on healthcare teams (Hass, 2016). Over time, PAs have widened their scope of practice and become

autonomous, lending themselves to a collaborative working relationship with supervising physicians in the last decade (AAPA, 2019). If the PAs change to a doctorate degree, there are vocalized concerns from them that the shift will strain and negatively impact the relationship between physicians and PAs (Kulo et al., 2021; O’Connell et al., 2020).

In 2015, the PA profession adopted the term “collaboration” to describe the PA-physician team practice to help states modernize their PA practice laws (AAPA, 2016). The change from supervised practice to collaborative was largely based on the shift that had occurred in the 50 years since the PA profession began to more accurately describe the role of the PA in the healthcare provider team. The term of supervision versus collaboration in the state legislation varies from state to state. Currently, 47 states have PA-supervisory agreements with physicians and only 10 states have restrictive scope of practice laws for PAs (American Medical Association [AMA], 2018; Valentin et al., 2020). The supervision agreements must be clearly defined especially in regards to verbiage toward physician liability if a PA’s actions result in litigation (Hickman, 2021). If the physician or employer fails to comply with proper supervision of a PA, then litigation against the PA will also result in liability to the employee and CP (Hickman, 2021).

One important distinction is the difference between autonomy and collaboration. Autonomy is the degree of physician involvement in the PAs’ practice (Moran et al., 2016). PAs are able to practice autonomously, without a physician directly onsite, seeing their own patients (Kaprielian & Kase, 2017). The concept of optimal team practice (OTP) further allows PAs to practice autonomously, removing the requirement of a physician co-signature on charts, certain administration and legal oversites having been removed (AAPA, 2022). The current professional model requires all PAs to work in collaboration with physicians. Although both are considered

advanced healthcare practitioners, one characteristic that differs between nurse practitioners and physician assistants is the required collaborative/supervisory relationship between physicians and PAs (Hass, 2016). In certain states, nurse practitioners may be required to work under supervision with physicians, but NPs also are able to practice independently with full autonomy in other states (AMA, 2021b; Kaprielian & Kase, 2017).

Despite the collaborative nature of physicians with PAs, resident physicians who interact with PAs do not view PAs as collaborators in patient care but rather like residents themselves (Polansky et al., 2021). There are barriers within the medical school model including the hierarchy in medicine and limited interprofessional training that influence perceptions of residents to the PA and physician collaborative relationship (Polansky et al., 2021). A common barrier to interprofessional collaboration is the lack of integration of interprofessional training in medical education (Rawlinson et al., 2021). In the onboarding process of new PAs joining a provider group, it is important to establish a mentoring relationship between the PA and CP to set up a culture of acceptance, ramping up PA clinical productivity, and integrating clinical knowledge (Anglin et al., 2021).

There was one study found on the collaborative relationship between physicians and PAs in regards to the quality of relationship and the prediction of PA well-being (Bernard, 2020). This study found that the strongest predictor of PA well-being and the level of autonomy was the quality of the relationship between the PA and CP (Bernard, 2020). PAs in general practice spend less time consulting their CP than PAs working in specialties (Coplan et al., 2017). The length of time a PA has been in practice is inversely proportional with the amount of time the PA spent consulting with their supervising physician, indicating a level of trust that began to increase between the PA and the supervising physician over time (Cawley & Bush, 2015).

Specialty physicians are more likely to be satisfied with a referral from a PA if they employ PAs at their clinic (Enns et al., 2003), which is echoed by Zielińska-Tomczak et al. (2021), who postulated that the nature of a future relationship between a physician and a collaborative practitioner, such as a pharmacist, was directly related to any attitudes formed by prior relationships. There seems to be a lack of physician-PA team-based training in medical schools, and regardless of the degree offered to PAs, this could be an important addition to medical school curriculum (Rawlinson et al., 2021).

The American Medical Association (AMA) distinctly opposes any legislation that would allow for PA independent practice and endorses PA patient care under the direct supervision of a physician or group of physicians (AMA, 2018). A post by the AMA on Twitter and Facebook on October 30, 2020, called for physician-led patient care and the limitation of NP and PA autonomy (Lampariello, 2020). The post included the hashtag #stopscopecreep and triggered a response from the AAPA who argued against the post as false and offensive (AAPA, 2020). The AMA opposition to PA expanded scope of practice includes the PA profession name change from physician assistant to physician associate, voicing concerns that the move will confuse patients and is an act toward independent practice (Bailey, 2021).

The AMA Scope of Practice Partnership has actively led the fight against legislation that they believe would inappropriately expand medical services for nonphysician health professionals (Robeznieks, 2022). Specifically, the AMA has actively worked to block the ability for nurse practitioners to independently diagnose and treat patients. The AMA has released articles specifically comparing claims of physicians to nurse practitioners including that patients prefer physician-led care, that scope-expansion increases cost, and that physicians are specifically trained to lead (AMA, 2021a).

The AMA is actively defeating legislation that would expand scope of practice to pharmacists, nurse practitioners, optometrists, and PAs. One key argument for the role of PAs is to increase access to rural and underserved areas, and the AMA states their healthcare mapper has not shown an increase to nonphysicians moving to rural areas to provide care (Robeznieks, 2022). This finding is directly in conflict with others which state the PA profession has increased access to healthcare (Coplan et al., 2017). The AMA is supportive of supervisory relationships with PAs in the team-based model of patient care and scope of care (AMA, 2018). While the AMA does not represent the whole of individual physician perspectives, research is lacking in the perception of physicians on the supervision and collaboration models with PAs, as well as the physician perspective on the debate of the entry-level doctorate for PAs.

### **The COVID-19 Impact on the PA Profession**

The healthcare field has seen massive rates of burnout and turnover since the onset of the COVID-19 pandemic, with 18% who have quit their jobs, 12% who were laid off, and 31% who have considered leaving (Galvin, 2021). In 2021, 30.6% of PAs reported symptoms of burnout with 40.2% of PAs considering leaving their principal clinical position (NCCPA, 2022a). The COVID-19 pandemic disrupted the healthcare systems and highlighted the insufficiencies and the limitations of the supervisory physician and PA relationship (McGrath et al., 2021).

PAs are some of the most flexible medical providers due to the training education model; yet, barriers to OTP created limitations in using PAs to their full scope during COVID-19 (McGrath et al., 2021; Westry et al., 2022). Specifically during the pandemic, the bylaws set by states and hospitals on the PA scope of practice created barriers, and qualified PAs were limited in the ability to help in a time of crisis (McGrath et al., 2021). Some states have a waiver in a state of emergency to release the constraints of a collaborative agreement between PA and CP;

however, the waiver varies from state to state (McGrath et al., 2021; Valentin et al., 2020).

### **Theoretical Framework of Collaboration**

Over the past decade, there has been a dramatic increase in the workplace of the use of teams and collaboration across a variety of industries (John Wiley & Sons Inc, 2020). The rise of the team-oriented workplace, as well as the complex nature of interpersonal and interprofessional collaboration, will require a new lens to understand the benefits and the barriers to these relationships. The role between physician assistants and collaborative physicians is one important interprofessional dynamic within the healthcare team. While the AMA endorses the supervisory terminology of PA-CP roles and the AAPA established collaboration as the term, the titles and policy language of the healthcare provider team are changing (AMA, 2018; AAPA 2016). As the role of PA transitions from a supervisory terminology to a collaborative relationship, understanding the theory of collaboration is key in the stability of the healthcare team (AAPA, 2016).

Collaboration theory is a new theory as the workforce has dramatically changed to a collaborative and team-based approach over the past decade (Colbry et al., 2014). Collaboration theory is different from leader-member exchange or leader-subordinate theories that rely on a hierarchy structure for respect and roles (Colbry et al., 2014). Collaboration theory is unique in that it allows for interprofessional and interdynamic relationships between multiple people that do not exist within a hierarchical structure (Colbry et al., 2014).

At an interpersonal, individual level, there are identifiable barriers to collaboration. A hierarchy model within organizational structure leads to a power imbalance which will result in a struggle of collaboration (Rawlinson et al., 2021). Notably, scholars writing multiple reviews of the literature indicated a hierarchy structure will limit collaboration at the structural level



(Sangaleti et al., 2017; Supper et al., 2015; Wranik et al., 2019). The medical professions historically are rooted in a hierarchy model starting early in medical education with a vertical flow of power from residents to attending physicians in clinics and hospitals (Vanstone & Grierson, 2022). The medical vertical hierarchy places physicians as the top provider and PAs are below them on a vertical model based on the title as well as supervising role.

A power-struggle between physicians and other collaborators hinders the cultivation of collaborative relationships (Vanstone & Grierson, 2022). Clinical hierarchies can be harmful in preventing open communication thus leading to errors in patient care and obstruction of interprofessional collaboration (Vanstone & Grierson, 2022). Physicians can misunderstand an expanded role of a collaborative interprofessional relationship and then have difficulties in their professional identity (Rawlison et al., 2021). One primary collaboration barrier was identified by Rawlison et al. in “the lack of clarity regarding functions and scopes of other professionals and fear of loss of territory/professional identity in newly defined roles was associated with the depreciation of other professionals’ contributions and skills...” (2021, p. 7). This depreciation as well as lack of clarity of other interprofessional roles was noted in several studies (Bélanger & Rodríguez, 2008; O’Reilly et al., 2017; O’Sullivan et al., 2015; Sangaleti et al., 2017; Supper et al., 2015; Xyrichis & Lowton, 2008). It could then be hypothesized that a physician could sense a loss of territory within their doctoral title if PAs move to an entry level doctoral degree.

Ideal collaboration between nurses and physicians results in positive patient outcomes, optimal patient care, improved communication, and enhanced knowledge (Mahdizadeh et al., 2017). Researchers in economic and relationship theories have shown that relationships built on trust and collaboration are superior in performance compared to power-based relationships (Frydlinger et al., 2013). Collaboration is directly related to teamwork and the concepts of

interprofessional care on a healthcare team (O'Reilly et al., 2017).

The distinct nature of collaboration compared to other leadership theories certainly applies to the healthcare team between CPs and PAs. Collaboration is any on-going interpersonal interaction that may not be characterized by a significant power imbalance to achieve common goals (Colbry et al., 2014). As the PA profession continues to endorse collaboration as the terminology and philosophy of the physician-PA relationship, cultivation of collaboration is key for the healthcare team and for patient outcomes. Most importantly, positive collaboration in team-based models has been associated with the prevention of burnout (Bernard & McMoon, 2019). If positive CP relationships lend themselves to lower levels of burnout among PAs, then decisions to change the PA degree should include an evaluation of the impact a degree change may have on the CP relationship.

### **Summary**

The PA profession started nearly 60 years ago to expand the healthcare team under the supervision of a physician. As the profession progressed throughout the years and expanded core competencies, PAs have established themselves as valuable members of the healthcare team providing excellent patient care. In recent years, the AAPA has changed terminology to describe the relationship of PA and physician from supervisory to collaborative. Despite state legislation and the AMA endorsing the supervisory term, OTP as well as the situation of the pandemic have started to shift PAs to an autonomous and collaborative profession with physicians. As other healthcare professionals such as nursing, physical therapists, and pharmacists have transitioned to a doctorate degree, PAs are also considering the trends in their scope of practice and career to consider this degree change. The perceptions of potential positive and negative impact this may have on the profession is mixed and varies widely based on the stakeholder. Due to the important

collaboration between CPs and PAs, how this degree change may impact the quality of the relationship between CPs and PAs is broadly unknown.

Chapter 3 will describe the methods of the study to uncover descriptive statistics and significance of the PA and CP relationship in regards to the PA degree. This next chapter will also describe the research instrument, measures, and the description of the survey respondents. The description of variables, data cleaning, and statistical analysis plan will be discussed. Finally, the chapter will conclude with the limitations of the study in addition to ethical considerations.

## Chapter Three: Methodology

### Introduction

The purpose of this study was to describe the demographic characteristics of physician assistants/associates (PAs) who have doctoral degrees, describe work-related characteristics of PAs who have doctoral degrees, and identify PAs' perception of the quality of collaborative relationships with their CP. To assess these relationships, the 2021 PA salary survey data from AAPA were obtained and analyzed. This chapter will cover the research method design, instrument, description of survey respondents, variables, data cleaning, and statistical analysis. Furthermore, this chapter will include the limitations of the study and ethical considerations.

### Purpose and Research Questions

The purpose of this study was to use secondary data to describe the perceived quality of relationship between physicians and physician assistants who currently have doctoral degrees. Specifically, the goals of this study were to describe the demographic characteristics of PAs who have doctoral degrees, describe work-related characteristics of PAs who have doctoral degrees, and explore the quality of collaborative relationships with CPs based on having a doctoral degree. This study investigated the following research questions:

RQ1: Is there a statistically significant ( $p < 0.05$ ) difference in demographic characteristics (i.e., age, gender, race/ethnicity) between PAs who do and do not have a doctoral degree?

RQ2: Is there a statistically significant ( $p < 0.05$ ) difference in work-related factors (i.e., primary role, leadership role, primary workplace setting, primary specialty, length of time as a PA, years at current employer, percent time consulting CPs, CP policies during COVID-19

pandemic) between PAs who do and do not have a doctoral degree?

RQ3: Is there a statistically significant ( $p < 0.05$ ) difference in PAs' perception of positive, neutral, or negative collaborative relationships with CPs between PAs who do and do not have a doctoral degree?

### **Research Hypotheses**

The following are the hypotheses based on the collaboration theory (Colbry et al., 2014) and the literature review:

H01: No differences exist between demographic characteristics of PAs with doctoral degrees compared to those without a doctoral degree.

HA1: Significant differences exist between demographic characteristics of PAs with doctoral degrees compared to those without a doctoral degree.

H02: No differences exist between work-related factors between PAs with doctoral degrees to those without a doctoral degree.

HA2: Significant differences exist between work-related factors between PAs with doctoral degrees to those without a doctoral degree.

H03: No differences exist between PA perception of their CP collaboration relationship and PAs with or without a doctoral degree.

HA3: Significant differences exist between PA perception of their CP collaborative relationship and PAs with or without a doctoral degree.

### **Research Method and Design**

This study was a cross-sectional quantitative retrospective study using de-identified, raw, secondary data for statistical analysis from the AAPA (2021) Salary Survey. The data from AAPA were collected through surveys of the national PA population, providing a comprehensive

view of the PA workforce in regards to specific demographics.

### **Research Instrument and Measures**

For this study, raw de-identified data from the 2021 AAPA Salary Survey were used in analysis. The instrument consists of demographic questions such as gender, age and race/ethnicity. The survey asked PA practice-specific questions including the PAs' primary role (e.g., clinician, educator, administrator/manager, researcher) and specialty of medicine (i.e., primary care, internal medicine subspecialties, pediatric subspecialists, surgical subspecialties, emergency medicine, or other specialists), type of practice, salary, benefits, and titled roles. PAs also provided their highest degree earned (i.e., associate's, bachelor's, master's, or doctorate). PAs provided information about the length of time working as a PA, length of time in clinical practice, and years worked at the current employer. Collaboration was noted on three questions including ranking the perceived relationship between CP and PA, percent time spent consulting with the CP, and if collaborating requirements impeded the PAs' ability to work during COVID.

### **Survey Respondents**

#### ***Total Survey Respondents***

The American Academy of Physician Assistants (AAPA) distributed a salary survey to all PAs in the nation within the AAPA database. The survey was distributed to all PAs in the United States, 104,119 in 2021 from February 1, 2021 to March 1, 2021 (Henderson et al., 2021). Participants eligible to participate in the survey were PAs who were non-retired, based in the U.S., and had not opted out of research surveys. Participants must have worked as a clinician, educator, researcher, or administrator in 2020 (Henderson et al., 2021). The survey was sent via email with five reminder emails and announced on the AAPA website, through AAPA communications, and on social media. Incentives to complete the survey included a drawing to

win one of 20 \$50 gift cards to Amazon (Henderson et al., 2021).

A total of 13,865 responses were received, and there were 104,119 PAs on December 31, 2020 (Henderson et al., 2021; National Commission on Certification of Physician Assistants, 2021). Based on the number of participant responses and the total number of PAs in the United States at that time, the estimated response rate is 13.3%, although the exact response rate is unknown due to the method of distribution of the survey. The overall margin of error for the survey is +/- 0.79% at the 95% confidence level and response rates and margins of error vary by section and breakout (Henderson et al. 2021). Non-response to some items also contributed to different response rates based upon the individual items used in analyses. The survey required an email and valid AAPA ID to be entered to prevent any duplicate responses, and these identifiers were not used to link any responses to a specific participant (Henderson et al. 2021).

### ***Focused Survey Sample***

This study focused on a subset of the total responses from clinically practicing PAs. To be included in this analysis, participants must have answered that their primary occupation is a PA (other options were student, pre-PA, physician, nurse or NP, other healthcare provider, healthcare-related vendor, or other). In addition, participants must have answered “yes” to the question, “In the prior calendar year, were you clinically practicing at least some of the time?” Due to this study’s focused research questions regarding the relationship with a collaborating physician, this sample of clinically practicing PAs was appropriate. Those whose primary role in 2020 was student, not working, or retired were excluded from the study.

### **Variables**

#### ***Main Independent Variable***

In the survey, respondents had the option to choose the highest level of education they

had completed with the options of associate's, bachelor's, master's, or doctorate/professional (e.g., PhD, JD, MD). The independent variable, PAs' highest education, was recorded into a dichotomous variable (doctorate, yes or no) as 0 = has less than a doctoral degree and 1 = has a doctoral degree.

### ***Other Independent Variables***

There were additional independent variables that categorized the respondents and their demographics and clinical practice. Respondents indicated their gender (i.e., female, male, prefer to self-describe) and race/ethnicity (i.e., Asian, Black/African American, White, Hispanic, Other [recategorized to include American Indian/Alaskan Native, Native Hawaiian or Other Pacific Islander, two or more races], preferred not to answer). Ages were calculated by birth date and recategorized into ranges (i.e., < 30, 31-39, 40-49, 50-59, and 60+). Career lengths were categorized by years and recategorized into ranges (i.e., 0-4, 5-9, 10-14, 15-19, 20+). Lengths of time at employer were categorized by years (i.e., 0-1, 2-4, 5-9, 10-14, 15-19, 20+). Respondents were asked if they had a leadership role, either formally or informally, with the options of yes/formal, yes/informal, and no. Leadership was defined through task examples such as supervising staff, educating/orientating/onboarding others (not precepting), leading quality and performance improvement activities, or managing a budget.

Respondents indicated their primary role as a PA in 2020, including clinician, educator, administrator/manager, researcher, student, volunteer, not currently working, retired, or other. Those who responded student, not working, or retired were excluded from the study. Respondents indicated their primary setting which included outpatient clinic or physician office, hospital, or urgent care center. Additional primary setting options were recorded into a single category of other due to low frequency of respondents in individual areas which included



school/college/university health clinic, school/college/university full-time educator, ambulatory surgical center, rehabilitation facility, extended care facility/nursing home, occupational medicine/work site, correctional facility, and other.

Finally, respondents designated their primary specialty, which included primary care, internal medicine, pediatrics, surgical, emergency medicine, other specialty, and no medical specialty. Due to low frequency of respondents in pediatric subspecialists, they were reorganized into the category of other specialties.

### ***Dependent Variable***

The dependent variable was the quality of relationship with the collaborating physician. Quality of relationship is described in this study based on the survey question: “Rate your relationship with your collaborating physician” with the options of extremely positive, somewhat positive, neither positive nor negative, somewhat negative, or extremely negative. Analysis initially kept all five categories, however due to the low number of extremely negative or somewhat negative responses, those were categorized into one “negative” category. Similarly there were few differences between extremely positive and somewhat positive so these were combined into one “positive” category. Those respondents that answered neutral were kept in their own category.

There were two other questions on the survey regarding the collaboration between the physician and the PA. One question had the prompt: “Physician supervisory or collaborative requirements have impeded my ability to provide care during the COVID-19 pandemic” with options of yes-and this is still occurring, yes-but this is no longer occurring, or no.

An additional question asked participants to approximate the percent clinical time they spent consulting with their collaborating physician at their primary employer, with the option to

write in a number 0-100. The percent time was organized into ranges (<10%, 10-19%, 20-29%, 30-39%, 40-49%, 50-59%, 60-69%, 70-79%, 80-89%, >90%). Due to the low number of responses in individual percent ranges, these ranges were reorganized into groups for this study (<10%, 10-19%, 20-29%, 30-49%, 50-99%).

### **Data Cleaning**

Certain measures were transformed into a range for ease of reporting as well as eliminating small sample sizes with large ranges of numbers. Some variables were already reorganized by AAPA into categories in the raw data set. Any respondent can elect not to answer a question and thus would be missing in the data set. Cleaning of the data set was described above within the sections about specific variables.

### **Data Analysis**

To answer the research questions, descriptive statistics and chi-square tests were used. Descriptive statistics consisted of frequencies for comparisons of variables with PAs with and without doctoral degrees. A chi-square test analyzed the association between two variables measured by categories (Creswell & Creswell, 2018). Chi-square tests of independence were used to examine the cross-tabulation between the demographic variables (age, gender, race/ethnicity) and whether the respondent had a doctoral degree. Chi-square tests of independence were also used to examine cross-tabulation between doctoral degree and variables such as leadership role, primary role, primary setting, length of time as a PA, length of time practicing, years at current employer, as well as collaboration factors (rank, COVID impact, time spent consulting). Chi square tests may note significant differences; however they are sensitive to large samples. Even if a result is statistically significant, it may not be practically significant.

To analyze whether statistical differences occur between the ranked quality (positive,

negative, neutral) of collaborative relationships and holding a doctoral degree, a chi square test was used. A *p*-value of less than 0.05 was considered significant. SPSS 26 was used to perform the analysis.

### **Limitations**

There were multiple limitations to this study. First, the participants self-responded to the survey. In their responses, respondents may have provided an answer to the survey question, whether intentionally or unintentionally, that did not correctly represent themselves. By nature of a survey, self-selection bias occurred in that the respondents were allowed to decide if they wanted to participate in the survey. Self-selection may have led to over- or under-representation of certain individuals.

This survey was administered in 2021, reflecting on the year of 2020, specifically in the field of healthcare during which the global pandemic of COVID-19 was occurring. Administration of this survey during the pandemic may have affected response rates, and potentially skewed the positive or negative perceptions of collaboration due to the unique nature of healthcare during the pandemic.

The survey did not allow respondents to specify the specific type of doctoral degree they had earned, nor the order in which they had received their degrees. Some respondents may have had a doctoral prior to entering the PA profession, or others may have pursued a doctoral degree for professional advancement (such as academia rank for promotion or personal advancement) without direct association to the research questions.

There is a lack of matching data from supervising/CPs on their perception of the quality of relationship between themselves and PAs. While there are a handful of studies with physician input toward the doctoral degree debate, research is lacking surrounding the physician's

perception of the collaborating relationship with PAs. Further investigation into physician's perspectives of the CP/PA relationship is needed to obtain a triangulated data set toward collaborative team dynamics.

Team-based care models between workplace settings, such as hospital versus clinic, or surgery versus nonsurgical specialties, may influence the perceived relationship between PAs and CPs. Some CP and PA relationships are more professionally intimate with regular contact and interaction based upon settings and patient care models. Other CP and PA interactions may be minimal based upon the workplace setting. The time PAs spend consulting with CPs is likely influenced by more than simply the degree but additionally the years of experience as a clinically practicing PA, the years working with a specific CP, and the setting of patient care. These influencing factors would be important to distinguish in future research studies. Lastly, legislative policies surrounding the nature, terms, and specific scope of practice variables are determined by states. The relationship between a PA and CP may be varied by optical team practice status specific to states and this would be an excellent follow up study.

### **Ethical Considerations**

All participants consented to taking part in the survey. The survey included an initial question of consent and participation. The question asked, "Do you want to move the profession forward and make compensation and benefits more transparent?" Participants who replied "no" were disqualified from any further participation in the survey. If participants answered the question "Yes. By selecting 'yes' you are consenting to participate in this research" (Henderson et al., 2021). AAPA had access to all raw data responses and de-identified all data. AAPA ensures all responses are kept confidential. Data were stored at AAPA in a secure network and only reported as aggregated statistics without identification of any participant. The AAPA

approved sharing of the de-identified data with the lead researcher for this project (Appendix A). Only the lead researcher and committee members had access to the data. This study was approved by the Bethel University Institutional Review Board (Appendix B).

## Chapter Four: Results

### Introduction

The purpose of this study was to describe the demographic characteristics of physician assistants/associates (PAs) who have doctoral degrees, describe work-related characteristics of PAs who have doctoral degrees, and identify PAs' perception of the quality of collaborative relationships with their CP. Currently, the entry-level and terminal degree in the PA profession is a master's degree, although there is a considerable debate regarding a potential transition to entry-level and terminal doctoral degree credentials (AAPA, 2019; PAEA, 2022). The PA profession is largely divided regarding the potential move to a doctoral degree with support and opposition from a variety of perspectives (Brown et al., 2021; Fleming et al., 2021; Kulo et al., 2021; Miller & Coplan, 2017; O'Connell et al., 2021). The PA profession is largely based upon team-based practice through collaborative relationships with CPs, and cultivation of this relationship is key to protect against burnout and foster positive team dynamics (Bernard & McMoon, 2019; Knox et al., 2018; Willard-Grace et al., 2014). If the PAs change to a doctorate degree, the shift may strain and negatively impact the relationship between CPs and PAs (Kulo et al., 2021; O'Connell et al., 2020; Rawlinson et al., 2021; Vanstone & Grierson, 2022). To assess these relationships, the 2021 PA salary survey data from AAPA were obtained and analyzed. The population and research questions were determined by collaborative theory and the debate of the most appropriate terminal degree for PAs.

### Research Questions

RQ1: Is there a statistically significant ( $p < 0.05$ ) difference in demographic characteristics (i.e., age, gender, race/ethnicity) between PAs who do and do not have a doctoral

degree?

RQ2: Is there a statistically significant ( $p < 0.05$ ) difference in work-related factors (i.e., primary role, leadership role, primary workplace setting, primary specialty, length of time as a PA, years at current employer, percent time consulting CPs, CP policies during COVID-19 pandemic) between PAs who do and do not have a doctoral degree?

RQ3: Is there a statistically significant ( $p < 0.05$ ) difference in PAs' perception of positive, neutral, or negative collaborative relationships with CPs between PAs who do and do not have a doctoral degree?

This chapter provides descriptive statistics and the chi-square analysis of the 2021 AAPA Salary Survey data related to the research questions. The data analysis for this study was performed using SPSS version 26.

## **Response Rate**

### ***Total Survey Respondents***

The American Academy of Physician Assistants (AAPA) distributed a salary survey to all PAs in the nation within the AAPA database. The survey was distributed to all PAs in the United States, approximately 104,119 in 2021 from February 1, 2021 to March 1, 2021 (Henderson et al., 2021). Participants eligible to participate in the survey were PAs who were non-retired, based in the United States, and had not opted out of research surveys. Participants must have worked as a clinician, educator, researcher, or administrator in 2020 (Henderson et al., 2021). The survey was sent via email with five reminder emails and announced on the AAPA website, through AAPA communications, and on social media. Incentives to complete the survey included a drawing to win one of 20 \$50 gift cards to Amazon (Henderson et al., 2021).

A total of 13,865 responses were received and there were 104,119 PAs on December 31,

2020 (Henderson et al., 2021; National Commission on Certification of Physician Assistants, 2021). Based on the number of participant responses and the total number of PAs in the United States at that time, the estimated response rate is 13.3%, although the exact response rate is unknown due to the method of distribution of the survey. The overall margin of error for the survey is +/- 0.79% at the 95% confidence level and response rates and margins of error vary by section and breakout (Henderson et al., 2021). Non-response to some items also contributed to different response rates based upon the individual items used in analyses. The survey required an email and valid AAPA ID to be entered to prevent any duplicate responses, and these identifiers were not used to link any responses to a specific participant (Henderson et al., 2021).

### ***Focused Survey Sample***

This study focused on a subset of the total responses from clinically practicing PAs. To be included in this analysis, the participant must have answered that their primary occupation is a PA (other options were student, pre-PA, physician, nurse or NP, other healthcare provider, healthcare-related vendor, or other). In addition, the participant must have answered “yes” to the question, “In the prior calendar year, were you clinically practicing at least some of the time?” Due to the nature of this study’s focused research questions regarding the relationship with a collaborating physician, this sample of clinically practicing PAs will be appropriate. Those whose primary role in 2020 was student, not working, or retired were excluded from the study.

The sample included a total of 12,916 clinically practicing PAs and included PAs without a doctoral degree ( $n = 12,577, 97.4\%$ ) and PAs with a doctoral degree ( $n = 339, 2.6\%$ ). In 2020, approximately 2% of PAs reported having doctoral degrees, which similarly reflects the percentage distribution captured in this study (NCCPA, 2022).

### **Research Question 1**



Research Question 1 was, “Is there a statistically significant ( $p < 0.05$ ) difference in demographic characteristics (i.e., age, gender, race/ethnicity) between PAs who do and do not have a doctoral degree?” The hypothesis was that there were significant differences based on the literature review that a doctoral degree may lend itself to increased men and decreased racial diversity in the PA workforce (Fleming et al., 2021; Kulo et al., 2021; Togioka et al., 2022).

The data for this research question was taken from three items from the survey that asked participants to report their age, gender, and race/ethnicity. The sample included clinically practicing PAs without a doctoral degree ( $n = 12,577$ ) and PAs with a doctoral degree ( $n = 339$ ). Non-response or low response to some items also contributed to different response rates based upon the individual items used in analyses.

### *Differences in Age*

Among the participants who self-identified as having a doctoral degree, 19 (6.4%) were under the age of 30 (Table 1). The remaining 93.6% of PAs with doctoral degrees were over the age of 30 with a fairly evenly distributed spread among the decades with decrease at age 60 or above. Those who were in their 40s had the highest frequency of doctoral degrees. Chi-square tests of independence were calculated to determine if an association exists between age and the presence of a doctoral degree or not and this was considered statistically significant ( $p < 0.001$ ).

**Table 1**

#### *Age of PAs with and without a Doctoral Degree*

	Does not have a doctorate degree		Has a doctorate degree	
	<i>N</i>	%	<i>n</i>	%
Under 30	2,897	26.0	19	6.4
30-39	4,628	41.6	70	23.6
40-49	1,996	17.9	88	29.6
50-59	1,019	9.2	68	22.9
60 or older	584	5.2	52	17.5

### ***Differences in Gender***

Of the PAs without a doctoral degree, 9186 (73.5%) self-identified as female and 3310 (26.5%) as male (Table 2). Of PAs with a doctoral degree 55% self-identified as female and 45% self-identified as male. Few participants (<1%) identified their gender as self-described, so they were removed from the table and chi-square analysis for this specific category. Chi-square tests of independence were calculated to determine if an association exists between gender and the presence of a doctoral degree or not and this was considered statistically significant ( $p < 0.001$ ).

**Table 2**

*Gender of PAs with and without a Doctoral Degree*

	Does not have a doctorate degree		Has a doctorate degree	
	<i>n</i>	%	<i>n</i>	%
Male	3,310	26.5	149	45.0
Female	9,186	73.5	182	55.0

### ***Differences in Race/Ethnicity***

Table 3 depicts the self-identification of race/ethnicity of PAs with a doctoral degree. 226 (70.4%) identified as Non-Hispanic White, 36 (11.2%) as Hispanic/Latinx, 24 (7.5%) as Non-Hispanic Asian, 24 (7.5%) as Non-Hispanic Black/African American, and 11 (3.4%) as Other/Multiracial. Of PAs without a doctoral degree, 82.3% identified as Non-Hispanic White. Chi-square tests of independence were calculated to determine if an association exists between the race/ethnicity characteristics and the presence of a doctoral degree, which was considered statistically significant ( $p < 0.001$ ).

**Table 3***Race and Ethnicity of PAs with and without a Doctoral Degree*

	Does not have a doctorate degree		Has a doctorate degree		NCCPA*
	<i>n</i>	%	<i>n</i>	%	%
Non-Hispanic White	10,092	82.3	226	70.4	80.6
Non-Hispanic Black/African American	263	2.1	24	7.5	3.3
Hispanic or Latinx	738	6.0	36	11.2	6.8
Non-Hispanic Asian	847	6.9	24	7.5	6.2
Other and multi-racial	319	2.6	11	3.4	6.1

\*NCCPA data from 2021 *2021 Statistical Profile of Certified Physician Assistants* (NCCPA, 2022a)

**Question 1 Summary**

The first research question investigated if there was a statistically significant ( $p < 0.05$ ) difference in demographic characteristics (i.e., age, gender, race/ethnicity) between PAs who do and do not have a doctoral degree. The  $p$ -value was  $< 0.05$  in all three categories, indicating affirmation that there were statistically significant differences between age, gender, and race/ethnicity between PAs who do and do not have a degree.

**Research Question 2**

Research Question 2 was: “Is there a statistically significant ( $p < 0.05$ ) difference in work-related factors (i.e., primary role, leadership role, primary workplace setting, primary specialty, length of time as a PA, years at current employer, percent time consulting CPs, CP policies during COVID-19 pandemic) between PAs who do and do not have a doctoral degree?”

The data for this research question were taken from multiple items that asked participants to report their primary or leadership role, primary workplace setting and specialty, length of time as a PA, years at current employer, percent time consulting CPs, CP policies during COVID-19

pandemic. Descriptive statistics and chi-square tests of independence were performed.

### ***Differences in Primary Role***

The primary role of the participants was a factor that was explored (Table 4). Among the participants who had a doctoral degree, 300 (90.4%) were primarily clinicians and 32 (9.6%) were educators. Among participants who did not have a doctoral degree, 99.2% were primarily clinicians and <1% were educators. The remaining few were primarily administrators or researchers. Due to the very small number of participants who identified as administrators and researchers (<1%), they were removed from the analysis. When the administrators and researchers were removed from the analysis, the  $p$ -value was  $< 0.001$ , however the minimum expected cell count in this category was still not considered valid for interpretation and thus was unknown in statistical significance.

**Table 4**

#### *Primary Role of PAs with and without a Doctoral Degree*

	Does not have a doctorate degree		Has a doctorate degree	
	<i>N</i>	%	<i>n</i>	%
Clinician	12,366	99.2	300	90.4
Educator	95	0.8	32	9.6

### ***Differences in Leadership Role***

Table 5 depicts the descriptive statistics of PA leadership roles. Of PAs with a doctoral degree, 102 (30.1%) held an informal leadership role, 98 (28.9%) held a formal leadership role, and 139 (41%) did not hold a leadership role. Of PAs without a doctoral degree, 8178 (65%) did not hold a leadership role, 3072 (24.4%) held an informal leadership role, and 1325 (10.5%) held a formal leadership role. Chi-square tests of independence were calculated to determine if an association exists between the leadership and the presence of a doctoral degree or not and this was considered statistically significant ( $p < 0.001$ ).

**Table 5***Leadership Role of PAs with and without a Doctoral Degree*

	Does not have a doctorate degree		Has a doctorate degree	
	<i>n</i>	%	<i>n</i>	%
Formal	1,325	10.5	98	28.9
Informal	3,072	24.4	102	30.1
None	8,178	65.0	139	41.0

***Differences in Primary Workplace Setting***

The primary workplace setting and primary specialty of the PA were additional factors that were explored (Table 6). Among the participants with a doctoral degree, 158 (46.6%) worked in an outpatient clinic or physician office, 119 (35.1%) worked at a hospital, 23 (6.8%) worked at an urgent care, and 39 (11.5%) worked in other settings. PAs without a doctoral degree worked in an outpatient clinic (54%) or hospital (36.2%). Chi-square tests of independence were calculated to determine if an association exists between the workplace settings and the presence of a doctoral degree or not and this was considered statistically significant ( $p < 0.001$ ).

**Table 6***Primary Setting of PAs with and without a Doctoral Degree*

	Does not have a doctorate degree		Has a doctorate degree	
	<i>n</i>	%	<i>n</i>	%
Outpatient Clinic	6,791	54.0	158	46.4
Hospital	4,557	36.2	119	35.1
Urgent Care Center	666	5.3	23	6.8
Other	563	4.5	39	11.5

***Differences in Primary Specialty***

Table 7 depicts the primary setting of PAs. Among participants with a doctoral degree,

109 (32.3%) worked in “other” specialties, 71 (20.9%) in primary care, 57 (16.8%) in surgical subspecialties, 54 (15.9%) in internal medicine subspecialties, 37 (10.9%) in emergency medicine, and the small remainder were no medical specialty. Among participants without a doctoral degree, 27.9% were in surgical subspecialties, 27.9% in other specialties, and 21.5% in primary care. Chi-square tests of independence were calculated to determine if an association exists between the primary specialty and the presence of a doctoral degree or not and this was considered statistically significant ( $p < 0.001$ ).

**Table 7**

*Primary Specialty of PAs with and without a Doctoral Degree*

	Does not have a doctorate degree		Has a doctorate degree	
	<i>N</i>	%	<i>n</i>	%
Primary Care	2,699	21.5	71	20.9
Internal Medicine Subspecialties	1,582	12.6	54	15.9
Surgical Subspecialties	3,506	27.9	57	16.8
Emergency Medicine	1,065	8.5	37	10.9
Other Specialties	3,502	27.9	109	32.2
No Medical Specialty	223	1.8	11	3.2

*Differences in Length of Time as a PA*

Time variables such as the length of time as a PA were analyzed (Table 8). Among PAs who had a doctoral degree, 98 (28%) have been a PA for more than 20 years, 39 (11.5%) for 15-19 years, 86 (25.4%) for 10-14 years, 62 (18.3%) for 5-9 years, and the remaining for less than 5 years. Of PAs without a doctoral degree, 38% have been a PA for <5 years, 24.6% between 5-9 years, 14.3% between 10-14 years, 9.5% between 15-19 years, and the remainder >20 years. Chi-square tests of independence were calculated to determine if an association exists between the length of time as a PA and the presence of a doctoral degree and this was considered statistically significant ( $p < 0.001$ ).

**Table 8***Number of Years as a PA with and without a Doctoral Degree*

	Does not have a doctorate degree		Has a doctorate degree	
	<i>n</i>	%	<i>n</i>	%
0-4	4,774	38.0	57	16.8
5-9	3,095	24.6	62	18.3
10-14	1,793	14.3	86	25.4
15-19	1,213	9.6	39	11.5
20 or more	1,702	13.5	95	28.0

***Differences in Years at Current Employer***

Time variables such as the years at the current employer were analyzed (Table 9). Of PAs with doctoral degrees, 52.4% have been at their employer for under 5 years and 36.9% have been with their employer between 5-14 years. Of PAs without a doctoral degree, 66.2% have been at their employer for under 5 years and 27.6% have been with their employer between 5-14 years. Chi-square tests of independence were calculated to determine if an association exists between the years at the current employer and the presence of a doctoral degree and this was considered statistically significant ( $p < 0.001$ ).

**Table 9***Years at Current Employer of PAs with and without a Doctoral Degree*

	Does not have a doctorate degree		Has a doctorate degree	
	<i>N</i>	%	<i>n</i>	%
0-1	3,437	28.0	52	15.5
2-4	4,691	38.2	124	36.9
5-9	2,413	19.7	79	23.5
10-14	864	7.0	45	13.4
15-19	475	3.9	18	5.4
20 or more	388	3.2	18	5.4

***Differences in Time Consulting with CP***

Two workplace setting questions were specific to PAs' collaboration with physicians.

The first was the length of time spent consulting the CP (Table 10). 199 (67.2%) of PAs with doctoral degrees spent <10% of the time consulting the CP and 4711 (44.7%) of PAs without doctoral degrees spent <10% of the time consulting the CP. 4.7% of PAs with doctoral degrees spent 50% or more of their time consulting the CP and 12% of PAs without a doctoral degree spent 50% or more of their time consulting the CP. Chi-square test of independence were calculated to determine if an association exists between the percent time consulting CP and the presence of a doctoral degree and this was considered statistically significant ( $p < 0.001$ ).

**Table 10**

*Percent Time Spent Consulting CP among PAs with and without a Doctoral Degree*

	Does not have a doctorate degree		Has a doctorate degree	
	<i>n</i>	%	<i>n</i>	%
Under 10	4,711	44.7	199	67.2
10-19	2,495	23.7	49	16.6
20-29	1,343	12.7	21	7.1
30-49	736	6.9	13	4.4
50-99	1,255	12.0	14	4.7

***Differences in Perception of Impediment in Collaboration Agreements during COVID-19***

***Pandemic***

The second workplace setting questions specific to PAs' collaboration with physicians surrounded the impact of collaboration agreements and the ability to provide care during the COVID-19 pandemic (Table 11). Participants were asked if the supervisory or collaborative requirements impeded their ability to provide care during the COVID-19 pandemic. Among PAs with doctoral degrees, 268 (79.8%) denied impediment on practice due to collaborating requirements, and the remainder stated yes it impeded during that time but has since resolved (6.5%) or yes it impeded and continues to impede practice (13.7%). Among PAs without doctoral degrees, 90.9% denied impediment on practice due to collaborating requirements, and



the remainder stated yes it impeded during that time but has since resolved (4.0%) or yes it impeded and continues to impede practice (5.2%). Chi-square test of independence were calculated to determine if an association exists between the perception of impediment of a collaboration agreement during the COVID-19 pandemic and the presence of a doctoral degree and this was considered statistically significant ( $p < 0.001$ ).

**Table 11**

*Perception of Impediment in Collaboration Agreements during COVID-19 Pandemic among PAs with and without a Doctoral Degree*

	Does not have a doctorate degree		Has a doctorate degree	
	<i>n</i>	%	<i>n</i>	%
No	11377	90.9	268	79.8
Currently Yes	645	5.2	46	13.7
Yes but no longer occurring	499	4.0	22	6.5

### **Question 2 Summary**

The second research question investigated if there are statistically significant differences in work-related factors (i.e., primary role, leadership role, primary workplace setting, primary specialty, length of time as a PA, years at current employer, percent time consulting CPs, CP policies during COVID-19 pandemic) between PAs who do and do not have a doctoral degree. Other than the variable of the PA primary role in which the p-value was invalid in significance, for all other categories the  $p$ -value was  $< 0.05$  in indicating affirmation that there were statistically significant differences between age, gender, and race/ethnicity between PAs who do and do not have a degree.

### **Research Question 3**

Research Question 3 was: “Is there a statistically significant ( $p < 0.05$ ) difference in PAs’ perception of positive, neutral, or negative collaborative relationships with CPs between PAs who

do and do not have a doctoral degree?”

The data for this research question was taken from a survey item that asked participants to rate their relationship with their CP as extremely positive, somewhat positive, neither positive nor negative, somewhat negative, or extremely negative (Table 12). PAs without a doctoral degree largely rated their CP relationship as extremely positive ( $n = 6,632$ ; 61.1%) or somewhat positive ( $n = 2,931$ ; 27%). PAs with a doctoral degree also overall ranked their CP relationship as extremely positive ( $n = 195$ ; 64.1%) or somewhat positive ( $n = 63$ ; 20.7%). Very few PAs, with or without doctoral degrees rated their relationship as negative. There were slight frequency differences between PAs with a doctoral degree ( $n = 37$ ; 12.2%) and PAs without a doctoral degree ( $n = 864$ , 8.0%) rating their CP relationship as neutral.

To analyze a general positive, neutral, or negative rating of relationships, the categories of “extremely positive” and “somewhat positive” were combined into a “positive” category, and “extremely negative” and “somewhat negative” were combined into a “negative” category. Since rating a relationship extremely versus somewhat positive categorizes overall as a positive response, combining these respondents as those with a doctoral degree and without was completed. The same process was also used for extremely and somewhat negative ratings. Chi-square tests of independence were calculated to determine if an association exists between the rated CP relationship and whether PAs had a doctoral degree when the ratings were recategorized into three options as positive, neutral, or negative, and the significance was  $p = 0.023$ .

**Table 12**

*Positive, Neutral, or Negative Rating Relationship between CP and PA among PAs with and without a Doctoral Degree*

	Does not have a doctorate degree		Has a doctorate degree	
	<i>n</i>	%	<i>n</i>	%
Negative	423	3.9	9	3.0
Neutral	864	8.0	37	12.2
Positive	9,563	88.1	258	84.9

### ***Question 3 Summary***

The third research question was, “Is there a statistically significant ( $p < 0.05$ ) difference in PAs’ perception of positive, neutral, or negative collaborative relationships with CPs between PAs who do and do not have a doctoral degree?” Descriptive statistics revealed a vast majority of PAs, both with and without a doctoral degree, rate their CP relationship as positive, and very few rate it as negative. There was slight variation of neutral responses with slightly more PAs with doctoral degrees rating the CP relationship as neither positive or negative. Chi-square analysis showed a statistically significant association between the rating of PAs’ relationship with CP and whether the PA had a doctoral degree.

### **Results Summary**

The purpose of this study was to describe the demographic characteristics of PAs who have doctoral degrees, describe work-related characteristics of PAs who have doctoral degrees, and identify PAs’ perception of the quality of collaborative relationships with their CP. Descriptive statistics and chi-square tests of independence were utilized to investigate the research questions. Statistically significant differences were found between demographic characteristics and work-related characteristics of PAs who do and do not have doctoral degrees.

The PA perception of positive, neutral, or negative relationship with the CP based on whether the PA had a doctoral degree was also statistically significant. The final chapter will discuss the results of the analysis, describe limitations and cautions of application, discuss the significance of the study, and make future recommendations

## Chapter Five: Discussion

### Overview of the Study

The purpose of this study was to describe the demographic characteristics of physician assistants/associates (PAs) who have doctoral degrees, describe work-related characteristics of PAs who have doctoral degrees, and identify PAs' perception of the quality of collaborative relationships with their CP. The first chapter of this study provided background information to the problem of the importance of the quality of relationship between PAs and collaborating physicians (CPs) in determining the proper terminal degrees for PAs. Chapter 2 synthesized current literature on the historical origins of the PA profession, evolution of degree changes for PAs and other healthcare professions, current debate for the PA terminal degree, the unique nature of the CP relationship with PAs, COVID-19 impact on the PA profession, and the theoretical framework of collaboration. Chapter 3 described the methodology to assess these relationships through the analysis of 2021 PA salary survey data from AAPA. Chapter 4 described the results of the analysis through descriptive statistical analysis and chi-square tests of independence. This final chapter will discuss the implications of the analysis results, describe limitations and cautions of application, discuss the significance of the study, and make recommendations for future research.

### Research Questions

RQ1: Is there a statistically significant ( $p < 0.05$ ) difference in demographic characteristics (i.e., age, gender, race/ethnicity) between PAs who do and do not have a doctoral degree?

RQ2: Is there a statistically significant ( $p < 0.05$ ) difference in work-related factors (i.e.,

primary role, leadership role, primary workplace setting, primary specialty, length of time as a PA, years at current employer, percent time consulting CPs, CP policies during COVID-19 pandemic) between PAs who do and do not have a doctoral degree?

RQ3: Is there a statistically significant ( $p < 0.05$ ) difference in PAs' perception of positive, neutral, or negative collaborative relationships with CPs between PAs who do and do not have a doctoral degree?

## **Major Findings and Implications**

### ***Research Question 1***

The first research question described three demographic characteristics of clinically practicing PAs with doctoral degrees: age, gender, and race/ethnicity.

**Age.** There was a significant association between age and whether the PA had a doctoral degree. By and large, most PAs with doctoral degrees were over the age of 30 which is not surprising considering the time investment it takes to complete a doctoral degree. The 6.4% who do have their doctoral degrees before age 30 may have obtained the degree before becoming a PA, or they may have pursued it for professional development reasons early in their career, such as working in academia, where doctoral degrees are encouraged or sometimes required based upon the position held. Over 93% of the participants with doctoral degrees spanned the ages of 30 and above with a fairly equal distribution among the decades. The study was limited in identifying if the doctoral degree was obtained at a certain age, or the order of obtaining the doctoral degree and PA certification.

This study suggests that doctoral degrees by PAs are infrequently completed by participants before the age of 30. The median age of recently certified PAs, defined as initial certification for six months or less, in 2020 was 28 years old (NCCPA, 2022b). Additionally,

74.9% of recently certified PAs in 2020 were under the age of 30 (NCCPA, 2022b). If the PA profession considers an entry-level doctoral degree, the majority who are under the age of 30 may desire to earn doctoral degrees. The mixed interest in an entry-level doctoral degree warrants additional research as the PA profession continues to draw young adults.

The average age of newly certified PAs has been between 27 and 28 years old since the year 2013 (NCCPA, 2022b). The profession has expanded its scope of practice and established itself firmly as important members of the healthcare team which has continued to increase the explosive growth of the PA profession. With the rapid growth in the profession, adolescent and college students likely have had earlier exposure to the PA career and go into post-secondary education pursuits with interest in the profession as a career. Undergraduate students now have Pre-PA clubs, and the preparation for PA school has changed including offering faculty advising for Pre-PA students. A degree change would also influence faculty who advise undergraduate students in pre-medicine or pre-health profession tracks.

As the graduation age of PA students continues to be young adults, a new shift toward a doctoral degree may carry with it expectations of expertise, leadership, or other skill sets by future employers when seen on job application resumes. PA leaders should consider what different skill sets or new qualifications PAs will offer if they hold a doctoral degree. Current doctoral programs offered to PAs include a variety of clinical doctoral programs, and applicants can choose a specific doctoral track such as education, clinical medicine, and leadership, among others. Clarity will be needed from national accreditors if the profession moves to a single-recommended doctoral degree type, or if variety will be allowed or encouraged.

A shift in the terminal degree has implications for PA education directly including tailoring doctoral classes for younger adults. The age demographics of students matriculating

into the PA programs may have influence on the cohort culture and patient care experience. While age alone does not correspond to leadership skills or maturity, PA programs must include the development of PA students in interpersonal and collaborative skills such as leadership. If most PAs with doctoral degrees are older than the average newly certified PAs, consideration in the type of curriculum needed in a PA doctoral program will be important to discuss before implementing the coursework.

PA school already has a high credit load for students in addition to high expectations of performance that is costly to students in time and finances. Younger women in doctoral programs spent more time on scholarship activities as compared to women over age 35, who had significantly higher amounts of time dedicated to non-educational activities (Hagedorn & Doyle, 1993). As PA programs may admit a wide range of ages to PA programs, understanding the different and unique needs of students with and without significant commitments outside of their studies is important for student retention and support. The addition of a doctoral degree curriculum may further strain non-traditional PA students and require new adaptive or deceleration tracks within PA programs. PA programs should consider what reasonable accommodations may be made to support a new generation of PA doctoral students.

Around 12% of newly certified PAs who are often younger in age report the ability to pursue future education as an important aspect of a work-life balance (NCCPA, 2022b). While it is unknown how future education is defined by these PAs, it suggests some level of desire to have additional professional development in this age group. Future studies are needed to evaluate the ongoing interest in pre-PA students and newly certified PAs to obtain a doctoral degree.

**Gender.** There is a notable statistical difference in the gender descriptive and frequency of PAs with and without a doctoral degree. Of participants without a doctoral degree, 73.5% of



the PAs were female, which reflects the overall gender distribution of the profession with almost 70% identifying as female (NCCPA, 2022). However, the gender disparity appears to be less in PAs with doctoral degrees with 55% female and 45% male. This is more consistent with the general U.S. gender distribution in the population with 50% female and 50% male (United States Census Bureau, 2021). This distribution of closer “equality” was supported by the hypothesis of male pursuit of professional development (Togioka et al., 2022). If the PAs change to an entry-level doctoral degree, there could be a potential to attract more males to pursue the profession due to the title, rank, and leadership potential. This has implications for marketing of the profession to pre-PA students, as well as current PAs, to consider a terminal-degree as a method of professional development.

If the doctoral degree results in a trend toward more equality in gender distribution, then this has implications not only for patient care, but also on healthcare team dynamics and PA educators. Similar to race and ethnicity disparity gaps, the gender gap in the PA profession is one area that should be addressed, and PA providers should reflect the demographic of the population. Having an increase in gender diversity in PAs who work primarily in clinical medicine and in PAs who work in education will be an important step to better reflect patient populations.

**Race and Ethnicity.** This study found a significant relationship between race/ethnicity and whether the PA had a doctoral degree. The PA profession has a majority that identifies as White (80%) and this study had most White PAs both without a doctoral degree (82.3%) and those with a degree (70.4%) with similar frequencies (NCCPA, 2022a). However, of participants with a doctoral degree, there were significantly higher frequencies of doctoral degrees in PAs who self-identified as Hispanic/Latinx (11.2%) and Non-Hispanic Black/African American

(7.5%). These are closer to statistics of U.S. demographics with the general population identifying Hispanic/Latino (18.9%) and Black/African American (13.6%; United States Census Bureau, 2021). This study suggests there was a larger frequency of PAs with doctoral degrees who did not identify as White compared to PAs without doctoral degrees. The difference of doctorate degree and race may be attributed by the pressure of non-White PAs to hold more education to achieve similar leadership positions (Kibe et al., 2022). As the U.S. continues to become increasingly diverse, the PA profession should reflect the patient population that they serve. Unfortunately, despite the massive growth of the profession, the distribution and diversity of race/ethnicity has remained overall unchanged for many years (NCCPA, 2022a).

The literature review demonstrated repetitive concern that change to a terminal doctoral degree will negatively impact diversity. This may be coupled with a potential increase in tuition cost if the length or credit load of a doctoral PA program is altered. An increased PA school tuition would weigh heavily on PA students who already take on significant debt to complete their training. There are barriers for low-socioeconomic students to PA school admission including influences of financial challenges on pre-admissions and the admissions process, in addition to historical macro- and microaggressions in education parity in the U.S.

PA programs must identify any implicit biases in the admissions process to their program, especially during the interview (VanderMeulen et al., 2022). Recommendations to improve increasing awareness of implicit bias includes faculty training and professional development regarding recognition of biases. Regardless of the terminal degree, understanding barriers and challenges of applicants to the PA profession is key to ensure the future diversifying of the profession to better reflect the diversity of the patient population in the U.S.

### ***Research Question 2***

The second research question described workplace characteristics of clinically practicing PAs with doctoral degrees.

**Primary Roles and Leadership Roles.** This study focused on a subset of PAs in the U.S. which included only PAs that were clinically practicing in 2020. Clinically practicing PAs can hold a variety of roles including clinician, educator, administrator, or researcher. The literature revealed that pursuit of a doctoral degree is more common in PA educators due to the nature of higher education and the value placed on higher degrees. The specific role of PAs with and without a doctoral degree had unknown statistical significance after analysis and thus cautious interpretation of the significance of specific roles is required. Of the PAs holding doctoral degrees, 90.4% were primarily clinicians and 9.6% were primarily educators.

The larger frequency of educators with doctoral degrees compared to clinical roles was expected; however perhaps it was expected to be even higher of a percentage of the sample in clinically practicing PAs. If most PA education jobs prefer a doctoral degree, there was an expectation that most PAs with doctoral degrees would be primarily in education. This study demonstrated that it is not the case and there are PAs working in primary clinical roles with doctoral degrees. Whether or not there is any specific difference or significant association of primary role and doctoral degree is still unclear and requires further research. There is currently not enough information about the specific motivating factors for PAs to hold a doctoral degree, but factors including personal professional development, leadership opportunities, or the pursuit of other interests (before or after becoming a PA) should be considered in research.

Importantly, if PA programs move to doctoral programs, then higher education must be able to offer and support doctoral programs, in addition to transitioning all PA faculty to hold a doctoral degree in order that they may teach in the programs. As PA faculty burnout is already at

high levels, requiring master's-trained faculty to additionally pursue doctoral credentials while simultaneously teaching is one area that would need to be transitioned with careful consideration (Klein et al., 2022; Valentin et al., 2022) Higher institution administrators will need to be supportive in PA faculty pursuing doctoral education and consider benefits to their own credibility in adding doctoral faculty, in addition to the cost of faculty training and maintenance of a doctoral program.

Clinically practicing PAs with doctoral degrees are statistically more likely to hold leadership roles. While prior studies have shown PA educators commonly pursue doctoral degrees for promotion, the impact the doctoral degree has in clinical settings for PAs is unknown (Miller & Coplan, 2022; Quincy & Snyder, 2020). PAs with doctoral degrees hold higher levels of frequency of both informal and formal leadership roles. In contrast, most PAs without a doctoral degree are not in any leadership positions.

One perceived benefit of an entry-level or terminal-doctoral degree is the potential for leadership. This finding poses a question if those interested in leadership positions are more likely to pursue further doctoral credentials, or if the doctoral degree provided a specific skill set or competitive resume to be equipped for a leadership role. Since the analysis in this study is of associations and not casual relationships, further studies are needed to explore these interactions between doctoral degrees and leadership roles. Additionally, since the majority of those with doctoral degrees were over the age of 30 and/or have been a PA for five years or more, leadership roles may be attributed to other contributing factors. In 2020, 13% of newly certified PAs stated that leadership potential was an employment incentive that was offered to them (NCCPA, 2022b). The lack of increase in the potential for leadership, despite the significant growth in the profession, may indicate that employers have not seen significant change in

leadership potential in PAs over that period. A change in the terminal degree of PAs may alter that potential incentive for employers if the doctoral degree title/training alters the perception of employers/administrators in leadership potential for PAs.

PA educators should consider what curriculum changes are needed in doctoral education for PA students. One such area would be in leadership development including interpersonal skills, conflict resolution, leadership styles and theories, and implicit bias training. While many PA programs already offer PA professionalism content, specific competencies toward leadership skills may vary from program to program. Accreditation considerations also should adapt clear leadership competencies and outcomes if the terminal degree change is desired to increase leadership positions held by PAs.

Hospitals, clinics, and other healthcare centers would also have potential impact in the terminal degree change, and potential additional leadership training. If PAs are existing in their training programs with additional leadership skills, increasing positions in leadership (medical boards, board of directors, clinical/surgical floor leads) to PAs may impact stated job requirements. Additionally, PAs with additional leadership skills through a doctoral program may have additional debt that would be appeased by increasing job offers or simply increasing the starting salary of PA with doctoral degrees.

**Primary Settings and Specialty.** Prior to this study, the primary setting in which clinically practicing PAs with doctoral degrees were currently working was unknown. This study revealed that there is fairly mirrored distribution of PAs with or without a doctoral in various settings. The largest frequency of PAs were working in an outpatient setting followed by a hospital setting and urgent care. The significant association between setting and doctoral degree was likely among the “other settings” category as it had a higher frequency among participants

that had their doctoral degree. This may be because “other settings” included the education sector. While there may be a significant difference in the work settings of PAs with and without doctoral degrees, further research is needed to ascertain the specifics of the settings and if an entry-level doctoral degree would change the frequency of settings in which PAs practice.

The specialties also revealed a fairly mirrored distribution of PAs in various settings, both with and without a doctoral degree. The most notable difference was 27.9% of PAs without a doctoral degree are in surgical subspecialists compared to 16.8% of PAs with a doctoral degree. This could be explained as PAs working surgical subspecialties may be trained on the job for their unique skill sets and not see a need for a doctoral degree. Alternatively, the PAs in surgical subspecialties may be pursuing fellowships specific to their area of expertise, without a need for doctoral degree credential.

**Length of Time as a PA and Working at an Employer.** There was a significant association between the length of time being a PA and holding a doctoral degree. For PAs with their doctoral degree, over a quarter have been a PA for over 20 years and, in general, PAs with their doctoral degrees have been PAs for longer lengths of time. Due to the nature of the study, it is unknown if the PA obtained their doctoral degree before or after being a PA. Regardless of the order of degree, the participants with doctoral degrees were largely more experienced PAs. It is possible that PAs obtained their doctoral degree post-PA training due to the pursuit of roles involving PA faculty promotion, leadership, or personal/professional development.

The years working at the employer for PAs with doctoral degrees showed significant association. Notably, 13.4% of PAs with their doctoral degree have worked at their employer for 10-14 years compared to 7.0% of PAs without their doctoral degree during that same length of time. The overall pattern of length of stay at employment was similar regardless of degree,

although PAs with doctoral degrees appear to tend to have stayed at their primary employer for longer lengths of time. This can be reflective of a variety of career trajectories including when they received their doctoral degree. In general, because the master's degree is the terminal degree, most PAs chose their employer for clinical reasons and not necessarily for credential changes. For PAs who have pursued a doctoral degree, it may indicate a desire to change career areas within their clinical practice such as entering education or focusing on public health.

**Workplace Setting and PA Collaboration with Physicians.** The time spent consulting CPs by PAs with and without doctoral degrees had statistically significant associations. In general, PAs with doctoral degrees overall spent less time consulting with the CPs. There are many factors surrounding the length of consulting with CPs by PAs including the setting, how long the PA has been working clinically, and the level of trust between the CP and PA. The findings in this study may be explained that PAs with doctoral degrees have generally been practicing as a PA for longer periods of time and thus less likely to need consultations. Prior research has suggested that the length of time a PA has been in practice is inversely proportional with the amount of time the PA spent consulting with their supervising physician, indicating a level of trust that began to increase between the PA and the supervising physician over time (Cawley & Bush, 2015). Exploring the potential impact of entry-level doctoral credentials on the time spent consulting CPs would be an important follow up study to determine these differences and application of significance.

There was a statistically significant association between the perception of the impediment of supervising/collaborating requirements of PAs and having a doctoral degree. Of PAs with doctoral degrees, 20.2% reported that collaboration requirements did impede their ability to provide care and 9.2% of PAs without doctoral degrees stated it impeded their ability for patient

care during the COVID-19 pandemic. There are many potential compounding factors that likely influenced the response to this question beyond the doctoral degree, including the participants' state-specific OTP laws, primary setting, length of time as a PA, and length of time with the employer. During COVID-19, some PAs may have been stretched more than their usual tasks and roles had previously dictated due to the increased need.

During the pandemic, the bylaws set by states and hospitals on the PA scope of practice created barriers and limited the ability of qualified PAs to help in a time of crisis (McGrath et al., 2021). Because PAs with doctoral degrees are often more experienced PAs in leadership positions, the characteristics of these PAs may have lent themselves to an eagerness to assist and to be more easily frustrated with OTP restrictions. Caution should be taken when considering application of this data and further studies with qualitative interviews and quantitative data points of specific state OTP and the impact of a PA doctoral degree would be important for further research.

### **Research Question 3**

The third and final research question analyzed was whether there is a statistically significant ( $p < 0.05$ ) difference in PAs' perception of positive, neutral, or negative collaborative relationships with CPs between PAs who do and do not have a doctoral degree.

#### ***Rating the CP Relationship***

PAs overall reported having a positive relationship with their collaborating physicians. In general, more than 84% of PAs, regardless if they had a doctoral degree or not, reported positive CP relationships. Similarly, fewer than 4% of PAs, regardless if they had a doctoral degree or not, reported CP negative relationships. As the PA profession has established PAs as valuable members of the healthcare team, the generalization of positive relationships within the PA and



CP team was expected.

There was a significant association found in the rating of the CP relationship based on PA degree. This is likely due to small differences of a neutral rating. Overall, PAs with and without a doctoral degree rate positive relationships with CPs, and those with a doctoral degree had slightly more neutral ratings. It is a 4% equivalent shift of those with a doctoral degree shifting slightly more neutral, and those without a doctoral degree shifting slightly more positive. The difference between participants responding “extremely positive” and “somewhat positive” is a subjective variable that was not clearly defined for the participants, and qualitative studies are recommended to further explore these variations of response.

The slightly higher frequency of neutral responses by PAs with doctoral degrees is difficult to interpret due to the multitude of factors that may impact and influence a relationship. Notably, many PA participants with their doctoral degrees were in leadership positions and had many years of experience as PAs, and thus their relationship with the CP may be described as neutral due to the autonomous nature of the PAs’ clinical practice, the outpatient settings, or administrative issues that were outside of clinical encounters. If a PA is practicing alongside a CP in a collegial and collaborative manner, one may perceive a neutral relationship. Another explanation is that a neutral response from a participant may be interpreted as difficult to answer or unwilling to answer. As discussed in the limitations below, this study did not control for various variables such as hours worked so conclusions are limited.

Care should be taken in generalizing these significant results due to the multiple confounders that were not controlled for in the study. Due to the lack of normality in the respondents to the question (which were overwhelmingly positive), other forms of statistical analysis such as linear regression were not preferred. In addition, controlling for every factor

impacting perceived quality of relationship between a PA and CP was beyond the scope of this exploratory study and further qualitative research is recommended.

One considerable implication of this research is the importance of maintaining a healthy, positive relationship with collaborating physicians. When newly certified PAs were asked what attribute of their future practice environment was most important to them, 47% stated the ability to practice in a collaborative environment where interprofessional engagement is emphasized (NCCPA, 2022b). The priority of the collaborative relationship was more important than practicing in a specific geographical area, specific setting, or even a specific area of interest (NCCPA, 2022b). Collaboration is clearly a value held by newly certified PAs, and interprofessional training on collaborative practice is a key area that should be addressed in PA and medical schools. As the literature review demonstrated, there is a need for medical students to have training on the scope of practice of PAs as well as the interprofessional collaboration dynamic between the professions in the healthcare team. PA programs should consider navigating new relationships with local medical schools and establishing interpersonal training to better inform one another.

The importance of clear communication between the PA professional organizations and the physician organizations is an implication of this study. As the literature review revealed, as leaders in healthcare policy and interprofessional leaders, it is vital for the AAPA to continue clear communication with the AMA, listen to vocal stakeholders from CPs, and offer medical school training for the scope of PAs and the role PAs have in the team-based model. The impact of changing the nature of the collaboration relationship between physicians and PAs is vital to consider toward the healthcare team dynamic.

Physicians are important stakeholders in the discussion of the PA/CP relationship and the

degree change debate for PAs. While the scope of practice is not directly related to the terminal degree in a healthcare field, because the AMA opposes PA increased scope of practice it is possible that they will also oppose an entry-level doctoral degree. With the AMA opposing scope of practice expansions due to the perception of scope-creep, there is concern that a doctoral degree for PAs would harm the relationship between physicians and PAs. Considering healthcare teams are primarily team-based collaborative teams, cultivation of healthy teams is imperative to prevent burnout of healthcare providers and foster a positive collaborative culture.

### **Limitations and Cautions of Application**

This study was an exploratory environmental scan with significant limitations. Due to the retrospective nature of the study, self-reported answers, and the potential for this data to be manipulated in application beyond its scope, caution should be taken when applying the results of this study toward recommendations in the doctoral degree debate in the PA profession. This study analyzed data regarding PAs with a terminal doctoral degree and does not have specific implications for entry-level data. This study is also limited by the sample size and may not be representative of the larger PA professoriate. Since this is a self-selected study, it is not a random sample which would then be reflective of the entire PA profession. Only 2% of the total sample ( $n = 12,916$ ) had their doctoral degree which represents a small number of the overall PA professional population, however it was similar to the NCCPA (2022b) data with 2% of PAs with doctoral degrees. Because the survey was not designed around the topic of PA doctoral degree and CP relationship, the answers may not be specifically reflective of these aims. Additional studies, both qualitative and quantitative in nature, would add additional data to triangulate these findings and bring clarity to the examination.

The relationship between CPs and PAs may have been influenced by compounding

variables that were not controlled for within the study due to the methodology limitations. The holding of a doctoral degree was simply one factor that was examined in the relationship. There are many factors that play a role in how collaborating relationships develop and are maintained including specific personalities, workplace settings, state OTP regulations, length of time known, and level of personal and professional trust. While it would be difficult to control for all of these complex interplay of relationship factors, further qualitative research studies could explore which factors may be influencing the relationship beyond the degree. Identifying factors that contribute to extremely positive or extremely negative PA/CP relationships would be an important study to pursue. Secondly, important research is missing from the physician perspective on the rated relationships with their PA.

This survey data was taken during the COVID-19 pandemic when collaboration relationships were most certainly altered from prior years as tremendous new stressors on healthcare personnel and settings were present. Because of the stressful work environments in medical teams during the pandemic setting, the perception of relationships may be more likely negative due to burnout, fear, or stress. Conversely, it could be more positive due to the forging-together during the crisis. Trends could be different in subgroups of PAs, and this data set did not reveal the order of credentials for PAs with and without a doctoral degree. Additionally, the specific type of doctoral degree was not identified. Future research studies surrounding the order of credentialing as well as motivating factors for doctoral degrees are recommended.

### **Significance of Results**

This study was the first to analyze data surrounding clinically practicing PAs with doctoral degrees and examine the relationship between PAs and CPs based upon PA degree. The literature review and collaboration theory identified the importance of collaborative team

practice in the prevention of burnout. As the PA profession considers the entry-level and terminal doctoral degree as an option for the PA profession, cultivation of positive and healthy collaboration among healthcare teams will be imperative in the prevention of burnout. Overall, PAs with and without a doctoral degree rate positive relationships with CPs. Future studies should aim to better describe the complex interplay of factors impacting collaborative relationships in the healthcare team model, specifically to the CP and PA relationships. As the PA profession continues to pursue OTP, continued communication and positive collaboration between PAs and physicians, training within PA schools and medical schools on the roles of healthcare members, and policy statements by the AMA and AAPA, will be key in the ongoing relationship between healthcare team members.

PAs with their doctoral degrees have higher frequencies of men and PAs of color; however, this may not necessarily be due to the degree itself. Most PAs with doctoral degrees from this survey were holding informal or formal leadership positions. This may be influenced by the additional descriptive analysis that most doctoral credentialed PAs have been PAs for longer lengths of time. The potential for increased leadership roles with a doctoral degree is suggested by this study; however it is unclear whether PAs who desire leadership pursue doctoral training or if the doctoral training equips and lends itself to leadership potential. Further research studies to further understand the directional relationship between a PA doctoral degree and leadership are recommended.

### **Recommendations for Additional Research**

Based on the study, the following future studies are recommended. Qualitative studies of the relationship between PAs and CPs and factors that influence positive or negative collaboration is important in the cultivation of healthy PA/CP relationships. Additional analysis

of the relationship rating factors, controlling for compounding variables and state-specific legislation policies. Inferential research that controls for variables such as PAs who were educators, the number of clinical hours they work per week, and the amount of experience they have when assessing their views of collaborative relationships would be an important follow up study.

The perspective of the physician on PA/CP collaboration relationship as well as the CP perception of a doctoral degree for PAs should be pursued. A pilot study could be conducted on collaborating practice training in medical schools and PA schools (specific PA/CP scope of practice, roles, medical team models, the cultivation of positive collaborative relationships, and protection of burnout) and a similar ongoing longitudinal study with burnout rates and outcomes after the training.

A retrospective longitudinal study would be an excellent follow up study to compare the rated relationships for the years prior to the pandemic and follow it through the pandemic to better understand how burnout may have altered team dynamics. Further studies are needed to investigate if the doctoral degree for PAs would result in leadership roles earlier in the career. The impact of an entry-level or terminal doctoral degree on compensation for PAs should be further explored. Additional research is needed in the order of doctoral degree credentials and PA credentials and the motivating factor why a doctoral degree was pursued. Research surrounding prospective and newly credentialed PAs and their desire for a doctoral degree would be helpful. A study regarding the differences of clinical doctoral degrees versus research doctoral degrees may impact the PA profession doctorate debate. Future research is needed surrounding the impact of a PA entry-level doctoral degree regarding possible impact of gender distribution and the PA profession. If the profession recommends PAs change to a terminal doctoral degree,

perhaps the gender gap disparity would narrow; however, due to the limitations of this study, further analysis to confirm and explore these findings is needed. Future studies are needed to evaluate the ongoing interest in Pre-PA students to obtain a doctoral degree.

While there may be a significant difference in the work settings of PAs with and without doctoral degrees, further research is needed to explore the specifics of the settings and if an entry-level doctoral degree would change the frequency of settings in which PAs practice. Future studies may analyze whether an entry-level doctoral degree is preferred for specific specialties.

### **Conclusion**

This study expands the knowledge of clinically practicing PAs with doctoral degrees and how they rate their relationship with their CPs. The results of this study provide professional organizations, healthcare teams, and individual healthcare providers a better understanding of the importance of the cultivation of positive collaborative environments. As burnout rates for healthcare professionals are rising, protection against burnout through positive collaborative teams is vital. Understanding the impact of doctoral level credentials on PA and physician collaboration is important. As the PA profession continues to consider the entry-level and terminal-degree, advocate for optimal team practice, and continue to provide high quality patient care, the development and maintenance of positive collaborative team practice is imperative for healthcare teams.

## References

- Accreditation Review Commission on Education for Physician Assistants. (2022). *Accredited programs*. <http://www.arc-pa.org/accreditation/accredited-programs/>
- Ackerman-Barger, K., London, M., Yi, A., Wilson, M., Fine, J., & Kayingo, G. (2022). Understanding early admission processes: Implications for physician assistant workforce diversity and healthcare equity. *Journal of the Physician Assistant Education Association*, 33(2), 119-121.
- American Academy of Physician Assistants. (2016). *Collaboration best describes PA practice*. [www.aapa.org](http://www.aapa.org).
- American Academy of Physician Assistants. (2019a). *AAPA fact sheet*. [https://www.aapa.org/wp-content/uploads/2019/02/About\\_AAPA\\_Fact\\_Sheet\\_February2019.pdf](https://www.aapa.org/wp-content/uploads/2019/02/About_AAPA_Fact_Sheet_February2019.pdf)
- American Academy of Physician Assistants. (2019b). *PA education preparing for excellence*. [aapa.org/wp-content/uploads/2016/12/Issue\\_Brief\\_PA\\_Education.pdf](http://www.aapa.org/wp-content/uploads/2016/12/Issue_Brief_PA_Education.pdf)
- American Academy of Physician Assistants. (2020, November 2). *AAPA Response to AMA's #StopScopeCreep Campaign*. <https://www.aapa.org/news-central/2020/11/aapas-response-to-amas-stopscopecreep-campaign/>
- American Academy of Physician Assistants. (2022). *Optimal team practice*. <https://www.aapa.org/advocacy-central/optimal-team-practice/>
- American Medical Association. (2018). *Physician assistant scope of practice*. <https://www.ama-assn.org/sites/ama-assn.org/files/corp/media-browser/public/arc-public/state-law-physician-assistant-scope-practice.pdf>



- American Medical Association. (2021a). *Protect access to physician-led care*. <https://www.ama-assn.org/system/files/scope-of-practice-protect-access-physician-led-care.pdf>
- American Medical Association. (2021b). *State law chart: Nurse practitioner practice authority*. <https://www.ama-assn.org/system/files/2020-02/ama-chart-np-practice-authority.pdf>
- Anglin, L., Sanchez, M., Butterfield, R., Rana, R., Everett, C. M., & Morgan, P. (2021). Emerging practices in onboarding programs for PAs: Strategies for onboarding. *Journal of the American Academy of Physician Assistants*, 34(1), 32-38. <https://doi.org/10.1097/01.JAA.0000723932.21395.74>
- Asprey, D. P., & Barwick, T. A. (2017). Physician assistant education association: Past, present, and future. *The Journal of Physician Assistant Education*; 28 Suppl 1, S49-S55. <https://doi.org/10.1097/JPA.0000000000000151>
- Bailey, S. R. (2021). Statement on AAPA change of physician assistant title. *American Medical Association*. <https://www.ama-assn.org/press-center/press-releases/statement-aapa-change-physician-assistant-title>
- Ballweg, R. M., & Hooker, R. S. (2017). Observations on the global spread of physician assistant education. *Journal of the Physician Assistant Education Association*, 28 Suppl 1, S75-S80.
- Bélangier, E., & Rodríguez, C. (2008). More than the sum of its parts? A qualitative research synthesis on multi-disciplinary primary care teams. *Journal of interprofessional care*, 22(6), 587-597. <https://doi.org/10.1080/13561820802380035>
- Bell, R. B., Davison, M., & Sefcik, D. (2002). A first survey: Measuring burnout in emergency medicine physician assistants. *JAAPA-Journal of the American Academy of Physicians Assistants*, 15(3), 40-52.

- Bernard, K. S. (2020). *Physician assistant burnout and fulfillment related to career development and physician relationship* [Unpublished doctoral dissertation]. Walden University.
- Bernard, K., & McMoon, M. (2019). Reading between the lines for a solution to burnout. *Journal of the American Academy of Physician Assistants*, 32(9), 48-50.  
<https://doi.org/10.1097/01.JAA.0000578776.46804.be>
- Blackstone, S. R., Johnson, A., Smith, N. E., McCall, T. C., Simmons, W. R., & Skelly, A. W. (2021). Depression, burnout, and professional outcomes among PAs. *Journal of the American Academy of Physician Assistants*, (34)9, 35-41.
- Bradley-Guidry, C., Burwell, N., Dorough, R., Bester, V., Kayingo, G., & Suzuki, S. (2022). An assessment of physician assistant student diversity in the United States: a snapshot for the healthcare workforce. *BMC Medical Education*, 22(1), 1-12.
- Brown, D., Quincy, B., & Snyder, J. (2021). Physician assistant education community assumptions about an entry-level doctoral degree. *The Journal of Physician Assistant Education*, 32(4), 207-224.
- Cawley, J. F. (2007). Physician assistant education: An abbreviated history. *The Journal of Physician Assistant Education*, 18(3), 6-15. <https://doi.org/10.1097/01367895-200718030-00001>
- Cawley, J. F., & Bush, E. (2015). Levels of supervision among practicing physician assistants. *Journal of the American Academy of Physician Assistants*, 28(1), 61-62.  
<https://doi.org/10.1097/01.JAA.0000458869.93806.0d>
- Cawley, J. F., Cawthon, E., & Hooker, R. S. (2012). Origins of the physician assistant movement in the United States. *The Journal of the American Academy of Physician Assistants*, 25(12), 36-42.

- Centers for Disease Control and Prevention (2022, May 25). *COVID data tracker*.  
<https://covid.cdc.gov/covid-data-tracker>
- Colbry, S., & Hurwitz, M., & Adair, R. (2014). Collaboration theory. *Journal of Leadership Education, 13*(4), 63-75.
- Coplan, B., Bautista, T. G., & Dehn, R. W. (2018). PA program characteristics and diversity in the profession. *Journal of the American Academy of Physician Assistants, 31*(3), 38-46.
- Coplan, B., Richardson, L., & Stoehr, J. D. (2009). Physician assistant program medical directors' opinions of an entry-level physician assistant clinical doctorate degree. *The Journal of Physician Assistant Education, 20*(2), 8-13.
- Coplan, B., Smith, N., & Cawley, J. F. (2017). PAs in primary care: Current status and workforce implications. *Journal of the American Academy of Physician Assistants, 30*(9), 35-42. <https://doi.org/10.1097/01.JAA.0000522136.76069.15>
- Crafts, K., Mistrot, S., Henningsgaard, M., Morris, K., Oliver, T., Tran, K., & Crafts, T. (2022). Physician assistant global advancement through the use of medical relief organizations. *Journal of Nursing & Interprofessional Leadership in Quality & Safety, 4*(1), 1-9.
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: qualitative, quantitative, and mixed methods approaches* (5<sup>th</sup> ed.). SAGE.
- De Hert, S. (2020). Burnout in healthcare workers: Prevalence, impact and preventative strategies. *Local and Regional Anesthesia, 13*, 171-183.  
<https://doi.org/10.2147/LRA.S240564>
- Diallo, S. N., & Noller, D. T. (2020). *The entry-level clinical doctorate for PAs: Curricular and administrative assumptions of PA educators*. <https://paea.edcast.com/pathways/entry-level-doctoral-degree-discussion>

- Doctor of Public Health Coalition. (2022). *DrPH vs PhD*. Doctor of Public Health Coalition.  
<https://drphcoalition.org/drphvsphd>
- Enns, S. M., Wynn, T., Muma, R. D., & Lary, M. J. (2003). Examining attitudes of specialist physicians regarding physician assistant referrals. *Journal of Allied Health, 32*(4), 270-274.
- Essary, A. C., Bernard, K. S., Coplan, B., Dehn, R., Forister, J. G., Smith, N. E., & Valentin, V. L. (2018). Burnout and job and career satisfaction in the physician assistant profession: A review of the literature. *NAM Perspectives*. Discussion Paper. National Academy of Medicine, Washington, DC. <https://doi.org/10.31478/201812b>
- Everett, C. M., Jackson G. L, Morgan, P. (2020). Why the science of healthcare delivery matters to practicing PAs. *Journal of American Academy of Physician Assistants, 33*(3), 51-53.
- Fleming, S., Kayingo, G., Gordes, K. L., Kulo, V., Jun, H. J., & Cawley, J. F. (2021). Would transitioning to an entry-level doctoral degree negatively affect PA profession diversity? *Journal of the American Academy of Physician Assistants, 34*(12), 1.
- Frydlinger, D., Nyden, J., & Vitasek, K. (2013). *Unpacking collaboration theory: What every negotiator needs to know to establish successful strategic relationships* [White paper]. University of Tennessee Knoxville.
- Galvin, G. (2021, October 4). *Nearly 1 in 5 healthcare workers have quit their jobs during the pandemic*. Morning Consult. <https://morningconsult.com/2021/10/04/health-care-workers-series-part-2-workforce/>
- Gordes, K. L., Fleming, S., Kulo, V., Cawley, J. F., Kibe, L., & Kayingo, G. (2022). An exploration into the physician assistant entry-level doctoral degree: Lessons learned from across health professions. *The Journal of Physician Assistant Education, 33*(1), 24-33.

<https://doi.org/10.1097/JPA.0000000000000411>

Hagedorn, L. S, Doyle, S., K. (1993). *Female doctoral students: How age differentiates institutional choice, retention enhancement, and scholarly accomplishments.*

[http://works.bepress.com/linda\\_hagedorn/9](http://works.bepress.com/linda_hagedorn/9)

Hall, H. (2020). The effect of the COVID-19 pandemic on healthcare workers' mental health, *Journal of American Academy of Physician Assistants*, 33(7), 45-48. <https://doi.org/10.1097/01.JAA.0000669772.78848.8c>

Hass, V. (2016). Physician assistants and nurse practitioners are not interchangeable. *Journal of the American Academy of Physician Assistants*, (29)4, 9-12.

Henderson, D., Smith, N. E., & McCall, T. C. (2021). *Salary Survey Data Documentation.* American Academy of PAs. Alexandria, VA.

Hickman K. A. (2021). Evaluating liability in the supervising physician, PA, and employer relationship. *Journal of the American Academy of Physician Assistants*, 34(11), 46-50. <https://doi.org/10.1097/01.JAA.0000791480.34010.29>

Hills, K., VanderMeulen, S., Snyder, J. A., Kohlhepp, W., Alexander, L. M., & Lane, S. (2020). Reimagining physician assistant education. *The Journal of Physician Assistant Education*, 31(3), 126-132. <https://doi.org/10.1097/JPA.0000000000000320>

Hilton, E. J., Lunardi, N., Sreedharan, R., Goff, K. L., Batakji, M., & Rosenberger, D. S. (2020). Two sides of the same coin: Addressing racial and gender disparities among physicians and the impact on the community they serve. *Anesthesiology clinics*, 38(2), 369-377. <https://doi.org/10.1016/j.anclin.2020.01.001>

Hooker, R. S. (2022). A history of PA employment economics. *Journal of the American Academy of Physician Assistants*, 35(1), 13-15.

- Hooker, R. S., Carter, R., & Cawley, J. F. (2004). The national commission on certification of physician assistants: History and role. *The Journal of Physician Assistant Education*, *15*(1), 8-15. <https://doi.org/10.1097/01367895-200415010-00001>
- Hooker, R. S., Kulo, V., Kayingo, G., Jun, H. J., & Cawley, J. F. (2022). Forecasting the physician assistant/associate workforce: 2020-2035. *Future Healthcare Journal*, *9*(1), 57.
- John Wiley & Sons Inc. (2020). *The state of teams* [White paper]. Five Behaviors. <https://www.discprofile.com/CMS/media/doc/5b/State-of-Teams.pdf>
- Jones, P. E. (2007). Physician assistant education in the United States. *Academic medicine : journal of the Association of American Medical Colleges*, *82*(9), 882-887. <https://doi.org/10.1097/ACM.0b013e31812f7c0c>
- Jun, H. J., Gordes, K. L., Fleming, S., Kulo, V., Cawley, J. F., & Kayingo, G. (2022). Developing and evaluating an instrument to assess perceptions of an entry-level physician associate doctoral degree. *BMC medical education*, *22*(1), 617. <https://doi.org/10.1186/s12909-022-03668-1>
- Kaprielian, V. S., & Kase, J. (2017). What can a PA or NP do for your Practice? *Family practice management*, *24*(2), 19-22.
- Kayingo, G., Bradley-Guidry, C., Burwell, N., Suzuki, S., Dorough, R., & Bester, V. (2022). Assessing and benchmarking equity, diversity, and inclusion in healthcare professions. *Journal of American Academy of Physician Assistants*, *35*(11), 51-54.
- Kayingo, G., Gordes, K. L., Jun, H. J., Fleming, S., Kulo, V., & Cawley J. F. (2021) Curriculum essentials of an entry-level PA doctoral degree. *Journal of American Academy of Physician Assistants*, *34*(10), 1-7.
- Kayingo, G., & Hass, V. M. (2017). *The health professions educator: A practical guide for new*

*and established faculty*. Springer Publishing.

<https://doi.org/10.1891/9780826177186.0037>

- Kayingo, G., Kibe, L., Venzon, A., Gordes, K. L., & Cawley J. F. (2021). Demand and supply for doctoral-prepared PA faculty: A 5-year national longitudinal study. *Journal of American Academy of Physician Assistants*, 34(12), 1.
- Kibe, L. W, Kayingo, G, & Cawley, J. F. (2018). Postprofessional PA doctorates: A new era. *Journal of American Academy of Physician Assistants*, 11(31), 46-51.
- Kibe, L., Rizzolo, D., Acker, S., Harbert, K., Sapre, K., Chopra, S. P., Collins, B., Pace., D., & Smith, N. (2020, November). *Research into the entry-level doctorate across four healthcare professions: An annotated bibliography*. American Academy of Physician Assistants. <https://www.aapa.org/download/72187/>
- Kibe L. W., Kayingo, G., Klein, A, Schrode, K. M. (2022). Academic leadership in physician assistant medical education: A cross-sectional analysis of the association with doctoral degree, gender, and minority status. *BMC Medical Education*. Advanced online print. <https://doi.org/10.21203/rs.3.rs-1589305/v1>
- Klein, A., Schrode, K., Kibe, L., Kayingo G. (2022). Reasons clinical education directors intend to leave their jobs [Preprint]. *Research Square*. <https://doi.org/10.21203/rs.3.rs-1964318/v1>
- Knox, M., Willard-Grace, R., Huang, B., & Grumbach, K. (2018). Maslach burnout inventory and a self-defined, single-item burnout measure produce different clinician and staff burnout estimates. *Journal of General Internal Medicine*, 33(8), 1344-1351.
- Kulo, V., Fleming, S., Gordes, K. L., Jun, H. J., Cawley, J. F., & Kayingo, G. (2021). A physician assistant entry-level degree: More harm than good? *BMC Medical Education*,

21(1), 274. <https://doi.org/10.1186/s12909-021-02725-5>

Lampariello, M. (2020, December 2). *Nurse practitioners, physician assistants clash with physicians in #stopscopecreep movement*. Clinical Advisor.

<https://www.clinicaladvisor.com/home/topics/practice-management-information-center/np-pa-clash-physicians-stop-scope-creep/>

Louwagie, V., Ness, B., O'Laughlin, D., Fisher, K., & Halasy, M. (2022). Understanding attributes and characteristics of the PA leader-physician relationship. *Journal of the American Academy of Physician Assistants*, 35(7), 52-56.

<https://doi.org/10.1097/01.JAA.0000832608.87699.1e>

Mahdizadeh, M., Heydari, A., & Moonaghi, H. K. (2017). Exploration of the process of interprofessional collaboration among nurses and physicians in Iran. *Electronic Physician*, 9(6), 4616-4624.

<https://doi.org/10.19082/4616>

McCall, T. C., & Smith, N. E. (2020). Reexamining the persisting wage gap between male and female PAs. *Journal of the American Academy of Physician Assistants*, 33(11), 38-42.

<https://doi.org/10.1097/01.JAA.0000718284.35516.87>

McCarty, J. E., Stuetzer, L. J., & Somers, J. E. (2001). Physician assistant program accreditation - history in the making. *The Journal of Physician Assistant Education*, 12(1), 24-38.

<https://doi.org/10.1097/01367895-200112010-00004>

McGrath, B. A., Saltzman, J., Cardin, T., & Callender, B. (2021). Modernizing the PA and NP workforce: Lessons learned from the COVID-19 pandemic. *Journal of the American Academy of Physician Assistants*, 34(8), 1-3.

<https://doi.org/10.1097/01.JAA.0000753924.93183.ed>

Menezes, P., Senkomago, V., & Coniglio, D. (2015). Physician assistant students' attitudes



- towards a clinical doctoral degree. *The Journal of Physician Assistant Education*, 26(1), 3-9. <https://doi.org/10.1097/JPA.0000000000000007>
- Miller, A. A., & Coplan, B. (2017). Physician assistant doctorate: A ticket to autonomy? *Physician Assistant Education Association*, 28(3S), S33-S37. <https://doi.org/10.1097/JPA.0000000000000147>
- Miller, A. A., & Coplan, B. (2022). Assessing the economics of an entry-level physician assistant doctoral degree. *The Journal of Physician Assistant Education*, 33(1), 34-40.
- Moran, E. A., Basa, E., Gao, J., Woodmansee, D., Almenoff, P. L., & Hooker, R. S. (2016). PA and NP Productivity in the Veterans Health Administration. *Journal of the American Academy of Physician Assistants*, 29(7), 1-6.
- Muma, R. D., Smith, B. S., Anderson, N., Richardson, M., Selzer, E., & White, R. (2011) Perceptions of US physicians regarding the entry-level doctoral degree in physician assistant education: A study with physician assistants and PA faculty. *Journal Allied Health*, 40(1), 25-30.
- National Commission on Certification of Physician Assistants. (2021). *2020 statistical profile of certified physician assistants*. [Annual Report]. <https://www.nccpa.net/wp-content/uploads/2022/04/Statistical-Profile-of-Certified-PAs-2020.pdf>
- National Commission on Certification of Physician Assistants. (2022a). *2021 statistical profile of certified physician assistants* [annual report]. <https://www.nccpa.net/wp-content/uploads/2022/08/2021StatProfileofCertifiedPAs-A-3.2.pdf>
- National Commission on Certification of Physician Assistants. (2022b). *2021 statistical profile of recently certified physician assistants* [annual report]. <https://www.nccpa.net/wp-content/uploads/2022/02/2020-Statistical-Profile-of-Recently-Certified-PAs-Final->

2\_23\_22.pdf

- Nishi, L, Soco, C, Duke, R., & Williams, L. (2022). A shadowing program for PAs and APRNs to promote collaborative care. *Journal of American Academy of Physician Assistants*, 24(4), 56-61. <https://doi.org/10.1097/01.JAA.0000819584.37785.9a>
- O’Connell, C, B., Rothpletz-Puglia, P., & Diaz, M. (2020). *Clinical doctorate as entry-level degree for PAs focus groups* [Abstract]. <https://paea.edcast.com/pathways/entry-level-doctoral-degree-discussion>
- O’Reilly, P., Lee, S. H., O’Sullivan, M., Cullen, W., Kennedy, C., & MacFarlane, A. (2017). Assessing the facilitators and barriers of interdisciplinary team working in primary care using normalization process theory: An integrative review. *PloS one*, 12(5). <https://doi.org/10.1371/journal.pone.0177026>
- O’Sullivan, M., Cullen, W., & MacFarlane, A. (2015). Primary care teams in Ireland: a qualitative mapping review of Irish grey and published literature. *Irish Journal of Medical Science*, 184(1), 69-73. <https://doi.org/10.1007/s11845-014-1128-x>
- Ohlemeier, L. S., & Muma, R.D. (2008). Perceptions of U.S. physician assistants regarding the entry-level doctoral degree in PA education. *The Journal of Physician Assistant Education*, 19(2), 10-17.
- Physician Assistant Education Association. (2009). Physician assistant clinical doctorate summit: Final report and summary. *The Journal of Physician Assistant Education*, 20(2), 22-28. <https://doi.org/10.1097/01367895-200920020-00006>
- Physician Assistant Education Association. (2020a). *By the numbers: Faculty report 4 data from the 2019 faculty & directors survey*. [https://paeaonline.org/wp-content/uploads/2020/10/PAEA\\_FacultyReport4\\_2020\\_updated07-20.pdf](https://paeaonline.org/wp-content/uploads/2020/10/PAEA_FacultyReport4_2020_updated07-20.pdf)

- Physician Assistant Education Association. (2020, April 29b). *Calls for proposals: PA entry-level doctoral degree research*. <https://paeaonline.org/alerts/call-for-proposals-pa-entry-level-doctoral-degree-research/>
- Physician Assistant Education Association. (2021, July 14). *PAEA policies and procedures manual*. [https://paeaonline.org/wp-content/uploads/2022/01/PP-Manual\\_07142021.pdf](https://paeaonline.org/wp-content/uploads/2022/01/PP-Manual_07142021.pdf)
- Physician Assistant Education Association. (2022). *Doctoral summit*. <https://paeaonline.org/events/doctoral-summit>.
- Polansky, M. N., Herrmann, D., Dolmans, D. H. J. M., Govaerts, M., Koch, U., Berger, J., & Stalmeijer, R. E. (2021). Exploring residents' perceptions of PA and NP roles and barriers to collaboration. *Journal of the American Academy of Physician Assistants*, 34(5), 42-50.
- Quincy, B., & Snyder, J. (2020). Coming of age in physician assistant education: Evolution of program characteristics. *The Journal of Physician Assistant Education*, 31(3), 112-120. <https://doi.org/10.1097/JPA.0000000000000308>
- Rawlinson, C., Carron, T., Cohidon, C., Arditi, C., Hong, Q. N., Pluye, P., Peytremann-Bridevaux, I., & Gilles, I. (2021). An overview of reviews on interprofessional collaboration in primary care: Barriers and facilitators. *International Journal of Integrated Care*, 21(2), 32. <https://doi.org/10.5334/ijic.5589>
- Reed, H., Bernard, K., & Smith, N. (2021). Reasons PAs leave their jobs. *Journal of the American Academy of Physician Assistants*, 34(8), 43-47.
- Rick, T. J., & Ballweg, R. (2017). Physician assistants and the expanding global health-care workforce. *The American Journal of Tropical Medicine and Hygiene*, 97(3), 643-644. <https://doi.org/10.4269/ajtmh.17-0176>

- Robeznieks, A. (2022). *Inside the AMA's wide-ranging fight against scope creep*. American Medical Association. <https://www.ama-assn.org/practice-management/scope-practice/inside-ama-s-wide-ranging-fight-against-scope-creep>
- Sangaletti, C., Schweitzer, M. C., Peduzzi, M., Zoboli, E., & Soares, C. B. (2017). Experiences and shared meaning of teamwork and interprofessional collaboration among health care professionals in primary health care settings: a systematic review. *JBIR Database of Systematic Reviews and Implementation Reports*, 15(11), 2723-2788. <https://doi.org/10.11124/JBISRIR-2016-003016>
- Smith, D. T., & Jacobson, C. K. (2016). Racial and gender disparities in the physician assistant Profession. *Health Services Research*, 51(3), 892-909. <https://doi.org/10.1111/1475-6773.12358>
- Supper, I., Catala, O., Lustman, M., Chemla, C., Bourgueil, Y., & Letrilliart, L. (2015). Interprofessional collaboration in primary health care: a review of facilitators and barriers perceived by involved actors. *Journal of Public Health*, 37(4), 716-27. DOI: <https://doi.org/10.1093/pubmed/fdu102>
- Swanchak, L. E., Levine, A. M., Arscott, K. E., & Golden, M. A. (2011). Physician assistant students' perceptions of an entry-level doctorate degree. *Journal of Physician Assistant Education*, 22(1), 19-24. <https://doi.org/10.1097/01367895-201122010-00004>
- Togioka, B. M., Duvivier, D., & Young, E. (2022). Diversity and discrimination in healthcare. *StatPearls*. <https://www.ncbi.nlm.nih.gov/books/NBK568721/>
- U.S. Bureau of Labor Statistics. (2022, April 18). *Physician assistants*. <https://www.bls.gov/ooh/healthcare/physician-assistants.htm#tab-6>
- U.S. Census Bureau. (2021). *Quick facts*.

<https://www.census.gov/quickfacts/fact/table/US/PST045221>

Valentine, V. (2019, December 4). Is a doctoral degree right for you? *Physician Assistant Education Association*. <https://paeaonline.org/is-a-doctoral-degree-right-for-you/>

Valentin, V. L., Najmabadi, S., Jones, J., & Everett, C. M. (2020). State scope of practice laws: An analysis of physician assistant programs and graduates. *Journal of Physician Assistant Education*, 31(4), 179-184. <https://doi.org/10.1097/JPA.0000000000000331>

Valentin, V., Najmabadi, S., Warner, M., White, R., & Dehn, R. (2022). Initial impact of the COVID-19 pandemic on physician assistant education. *Journal of the Physician Assistant Education Association*, 33(2), 78-86. <https://doi.org/10.1097/JPA.0000000000000421>

van den Brink, G., Hooker, R. S., Van Vught, A. J., Vermeulen, H., & Laurant, M. (2021).

The cost-effectiveness of physician assistants/associates: A systematic review of international evidence. *PloS One*, 16(11), e0259183.

<https://doi.org/10.1371/journal.pone.0259183>

Vanstone, M., & Grierson, L. (2022). Thinking about social power and hierarchy in medical education. *Med Educ*, 56(1), 91-97.

<https://onlinelibrary.wiley.com/doi/epdf/10.1111/medu.14659>

VanderMeulen, S., Snyder, J. A., Kohlhepp, W., Mustone Alexander, L., Straker, H., Bowser, J., & Bondy, M. J. (2022). Pipeline to the physician assistant profession: A look to the future. *The journal of physician assistant education. Journal of the Physician Assistant Education Association*, 33(1), e1-e10.

Willard-Grace, R., Hessler, D., Rogers, E., Dubé, K., Bodenheimer, T., & Grumbach, K.

(2014). Team structure and culture are associated with lower burnout in primary care. *Journal of the American Board of Family Medicine*, 27(2), 229-238.

<https://doi.org/10.3122/jabfm.2014.02.130215>

Westry, M. F. G., Nakano, P. E., Arrington, A.S., & Graf, J. M. (2022). PAs and NPs provide essential care for children with COVID-19. *Journal of American Academy of Physician Assistants*, 35(1), 53-57. <http://doi.org/10.1097/01.JAA.0000803640.69808.97>

Wranik, W. D., Price, S., Haydt, S. M., Edwards, J., Hatfield, K., Weir, J., & Doria, N. (2019). Implications of interprofessional primary care team characteristics for health services and patient health outcomes: A systematic review with narrative synthesis. *Health Policy*, 123(6), 550-563. <https://doi.org/10.1016/j.healthpol.2019.03.015>

Xyrichis, A., & Lowton, K. (2008). What fosters or prevents interprofessional teamworking in primary and community care? A literature review. *International Journal of Nursing Studies*, 45(1), 140-153. <https://doi.org/10.1016/j.ijnurstu.2007.01.015>

Zielińska-Tomczak, Ł., Cerbin-Koczorowska, M., Przymuszała, P., & Marciniak, R. (2021). How to effectively promote interprofessional collaboration? A qualitative study on physicians' and pharmacists' perspectives driven by the theory of planned behavior. *BMC Health Services Research*, 21(1), 903. <https://doi.org/10.1186/s12913-021-06903-5>

## Appendix A

### American Academy of Physician Assistant Approval for Data Usage

**Noel Smith** <nsmith@aapa.org>

Mar 30, 2022, 11:20 AM ☆ ↶ ⋮

to Derek, Sean, me, Daniel ▾

Hello Alicia,

We have approved your request for raw data from the 2021 AAPA Salary Survey for use with your dissertation. There will be no charge for the data usage. We will provide the file as an SPSS .sav file which can be used with [JASP](#).

We do have some concerns that your target group (PAs with doctorates) is a small one and that provision of some of the raw data may allow you to identify respondents. we will determine if a variable can be safely masked or if it needs to be withheld from the data set. If we mask the data, we will include what we did to mask it. If we withhold the data, we will work with you to provide the information you need for that variable and will provide reasonable analyses.

When you are doing the results, we are happy to review your interpretations to ensure that your understanding is aligned with how the data is collected. This is not required, however. We do require the right to review the final product prior to submission. We are looking for whether the interpretations match the manner of data collections.

We are in the process of also preparing data for the AAPA Salary Report so ask that you give us 2 to 4 weeks to deliver the data.

If you have any questions, please let us know. Derek Henderson will be the individual preparing the file for you.

Best wishes,

Noël

---

## Appendix B

### Bethel University Institutional Review Board Approval for the Study



March 19, 2022

Alicia Klein  
Bethel University St. Paul, MN 55112

Institutional Review Board 3900 Bethel Drive

PO2322  
St. Paul, MN 55112

Re: Project SP-17-22 Relationship Quality Between Physician Assistants and Collaborative Physicians

Dear Alicia,

On March 19, 2022, the Bethel University Institutional Review Board completed the review of your proposed study and approved the above referenced study.

Please note that this approval is limited to the project as described on the most recent Human Subjects Review Form documentation, including email correspondence. Also, please be reminded that it is the responsibility of the investigator(s) to bring to the attention of the IRB any proposed changes in the project or activity plans, and to report to



the IRB any unanticipated problems that may affect the welfare of human subjects. Last, the approval is valid until March 18, 2023.

Sincerely,

A handwritten signature in black ink, appearing to read "Peter Jankowski". The signature is fluid and cursive, with a prominent initial "P" and a long, sweeping underline.

Peter Jankowski, Ph.D.  
Chair, Bethel University IRB