How PA Programs Successfully Promote

Diversity in Admissions

by

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ABSTRACT

More underrepresented minority (URM) healthcare professionals are needed to improve health equity. Although holistic review in admissions has the potential to increase URM participation in health professions, recent data suggest that its impact varies substantially. The purpose of the dissertation research described here was to identify interventions to increase diversity among healthcare professionals and explore holistic review use in physician assistant (PA) program admissions to advance understanding of effective practices. PA programs were selected as an important prototype for exploratory studies since the extent of holistic review use in PA programs was unknown; at the same time, URM representation among PA students has decreased over the last 15 years.

A critical review of the literature revealed that various holistic review practices have been used by several health professions programs to successfully increase URM enrollment and that organizational culture may be a factor that promotes success. Following this, 2017 Physician Assistant Education Association survey data were analyzed to assess the frequency of holistic review in PA programs and examine its association with URM matriculation. Results from 221 of the 223 PA programs accredited at the time showed that 77.5% used holistic review, and its use modestly correlated with proportion of first-year students identified as ethnic minorities ($r_s = .20$, $p < .01$). Of particular interest, some programs using holistic review had substantially higher proportions of URM students than others. This finding laid the foundation for a

qualitative multiple case study to explore the role of organizational culture as a hypothesized antecedent to effective holistic admissions processes.

Survey study responses were used to select two PA program 'cases' that met criteria consistent with a proposed conceptual framework linking organizational culture that values diversity (or 'diversity culture') to holistic admissions associated with high URM enrollment. Directed content analysis of data revealed that diversity culture appears to be a strong driver of practices that support enrolling diverse classes of students.

Overall, this mixed methods program of research advances understanding of holistic review, its utility, and the influence of organizational culture. The research generated important insights with ramifications for current practice and future studies within PA and across health professions programs.

To my sister Amy, the philosopher, and my late sister, Sarah, the community organizer.

I so admire your work and am grateful beyond words for your presence in my life.

And to my late grandfather Robert C. Coplan, an ardent supporter of education,

whose work has helped thousands of students go to college.

Your memory is a continual source of inspiration.

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CHAPTER 1

INTRODUCTION AND LITERATURE REVIEW

Background

The significant value of diversity in the educational as well as healthcare

environment has been well-established (Bowman 2013; Coleman at al. 2014; Sullivan

2004; U.S. Department of Health and Human Services 2006); thus, "diversity is of

compelling interest" to all health professions educational programs (Vick et al. 2018, p.

53). Yet, over the last 15 years, many health professions have made little progress toward

increasing minority representation in their student populations, resulting in a persistent

lack of diversity in their workforces (Acosta et al. 2017; Coplan et al. 2018; Slaper et al.

2018; Snyder et al. 2018). Consistent with trends in the U.S. labor force, the racial and

ethnic diversity among the overall health workforce has increased (Snyder et al. 2018). In

relation to race specifically, the U.S. health workforce has in fact become more diverse

than the U.S. population (Snyder et al. 2018). However, trends in racial and ethnic

diversity differ substantially by health profession, and minorities underrepresented in the

health professions relative to the general population (i.e., Hispanics/Latinos [of all races],

African Americans, American Indians or Alaskan Natives, and Native Hawaiians or other

Pacific Islanders) are more highly represented among assistant, aide, and other healthcare

support occupations that do not require a bachelor's degree or higher level of education

(Snyder et al. 2018).

Diversity varies within health professions that require a college degree. In

general, the proportion of underrepresented minorities (URMs) in these professions (e.g.,

nurse practitioner, physician, physician assistant) are far from representative of the

overall population (see Figure 1). Furthermore, despite the rapid increase in the

proportion of minorities that comprise the U.S. population, URM representation among

some healthcare professionals, including physician assistants (PAs), has been stagnant

(Acosta et al. 2017; Coplan et al. 2018; Slapar et al. 2018; Snyder et al. 2018). In the

United States, between 2004 and 2018, the proportion of non-Hispanic/Latino whites

decreased from 67.4% to 60.4%, and the proportions of African Americans and

Hispanics/Latinos increased from 12.8% to 13.4% and from 14.1% to 18.3%,

respectively (U.S. Census Bureau 2005; U.S. Census Bureau 2018). Among PAs, lack of

improvement in URM representation is evident when comparing the U.S. population

demographics to the demographics of the PA student population. Between 2004 and

2018, although the percentage of first-year Hispanic/Latino students increased from 6.5%

to 8.1%, the percentage of first-year African American students decreased from 6.8% to

3.8%, and the percentage of other URMs remained virtually unchanged (Physician

Assistant Education Association 2004; Physician Assistant Education Association 2019).

Greater URM representation is needed among PA and other health professions

students to build a workforce that can reduce significant, ongoing health disparities that

negatively impact minority and other medically underserved populations (Mitchell and

Lassiter 2006; Nelson 2002; U.S. Department of Health and Human Services 2006).

Patient-provider racial or ethnic concordance has been shown to improve health care

quality, and URM healthcare providers are more likely than non-minorities to care for

underserved populations (Nelson 2002; U.S. Department of Health and Human Services

2006; Grumbach et al. 2008). Additionally, cross-cultural interactions in the learning

environment are associated with numerous benefits for all students – including improved cognitive and teamwork skills, reduced prejudice, and enhanced cultural competence – that strengthen preparedness for clinical practice (Bowman 2013; Sullivan 2004). Physician assistants, like nurse practitioners, are often relied on to provide care to diverse, medically underserved patients who cannot readily access physician care (Benitez et al. 2015; Grumbach et al. 2003; Proser et al. 2015). Therefore, the benefits of diversity within the PA profession are of particular importance and the lack of change is concerning.

Figure 1

Estimate of Diversity of U.S. Health Professions Compared to U.S. Population 2018
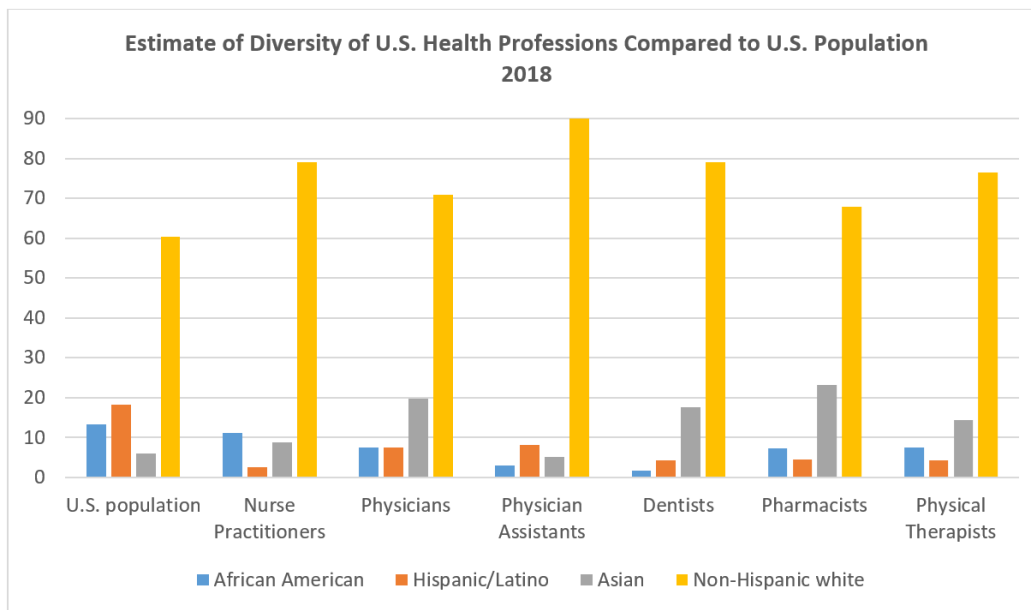
Estimates based on data from the U.S. Bureau of Labor Statistics 2018 and U.S. Census Bureau 2018. Race and ethnicity assessed separately; data for all races not available.

In recent years, many health professions programs including PA programs have adopted holistic review in admissions as one approach to achieving more diverse student enrollment (Urban Universities for HEALTH 2014). Holistic review refers to a flexible,

mission-aligned admissions process based on four core principles shown in Box 1

(AAMC 2013a). These principles include using broad-based selection criteria that are

expressly linked to a school mission or goals that emphasize the value of diversity and

giving balanced consideration to applicants' experiences, attributes, and academic

metrics (AAMC 2013a). Model holistic review practices include evaluating applicants'

non-academic attributes as part of initial applicant screening and educating admissions

committee members about the importance of school mission or diversity (Urban

Universities for HEALTH 2014). An overarching goal of holistic review is to increase

diversity among students (AAMC 2013a). The rationale for its ability to do so, which is

discussed further in Chapter 3, arises from a de-emphasis on academic metrics and

greater focus on attributes that applicants will contribute to the learning environment and

patient care, such as a diverse perspectives, resilience, and strong interpersonal skills.

Results of a large, national survey involving 228 health professions programs –

including nursing, medical, dental, and pharmacy schools – in which participants self-

reported the use of holistic review and diversity – found that a majority of respondents

(91% of medical schools, 93% of dental schools, 78% of pharmacy schools, and 47% of

baccalaureate nursing programs) were using holistic review in admissions and that its use

was associated with increased diversity among students (Urban Universities for

HEALTH 2014). Several other smaller reports, many of them consisting of single-

program pre-post evaluations, also suggest that holistic review may effectively increase

diversity among enrolled students (Roach et al. 2019; Wagner et al. 2019; Witzburg and

Sondheimer 2013; Zerwic et al. 2018). However, the extent to which PA programs use

holistic review is unknown, and the only evidence for its association with URM

enrollment comes from just one pre-post program evaluation (Felix et al. 2012).

Moreover, within health professions whose educational programs are known to widely

use holistic review, for example the medical and dental professions, the proportion of

URM students nationally has not significantly increased (Acosta et al. 2017; Slapar et al.

2018; Snyder et al. 2018). Therefore, it may be that a minority of programs using holistic

review experience significant improvement in URM enrollment.

Box 1

Core Principles of Holistic Review*

1. Selection criteria are broad-based, are clearly linked to school mission and goals, and promote diversity as an essential element to achieving institutional excellence.
 	
 2. A balance of applicant experiences, attributes, and academic metrics (E-A-M)
      a. Is used to assess applicants with the intent of creating a richly diverse interview and selection pool and student body;
      b. Is applied equitability across the entire candidate pool
      c. Is grounded in data that provide evidence supporting the use of selection criteria beyond grades and test scores
 	
 3. Admissions staff and committee members give individualized consideration to how each applicant may contribute to the school learning environment and to the profession, weighing and balancing the range of criteria needed in a class to achieve the outcomes desired by the school.
 	
 4. Race and ethnicity may be considered as factors when making admission-related decisions only when such consideration is narrowly tailored to achieve mission related educational interests and goals associated with student diversity and when considered as part of a broader mix of factors, which may include personal attributes, experiential factors, demographics, or other considerations.[a]
 	
 Source: Urban Universities for HEALTH 2014. Originally adapted from the Association of American Medical Colleges "Roadmap to excellence: Key concepts for evaluating the impact of medical school holistic admissions," 2013. Reused with permission from the Association of American Medical Colleges.

[a]Under federal law (and where permitted by state law); seven states have banned the use of race in admissions. These states are: Washington, Michigan, Nebraska, Arizona, New Hampshire, California and Florida.

Statement of the Problem

Considering the PA profession's contributions to caring for diverse populations and lack of progress toward increasing the proportion of URMs in its workforce, greater understanding of interventions that may increase the numbers of URM PAs is needed. Using holistic review in admissions is one approach that has the potential to increase diversity among students (Urban Universities for HEALTH 2014); however, several gaps in knowledge exist. First, the extent to which PA programs use holistic review and whether it is consistently associated with racial and ethnic diversity among PA students are uncertain. Second, it appears that use of holistic review is associated with a meaningful increase in URM enrollment at some educational programs but not at others, and little is known about why this is. Third, educators have identified the need for an organizational culture that values diversity and inclusion to support diversity-related efforts (Nivet and Castillo-Page 2016; Vick et al. 2018); yet, the influence of organizational culture on holistic review has not be directly studied. Finally, a conceptual model to guide implementation of holistic review processes has not been proposed (Artinian et al. 2017; Glazer et al. 2016).

Research Questions

The purpose of the research presented in this body of work is to address gaps in understanding discussed above. Accordingly, the dissertation explores the following main research questions:

1. Why is greater URM representation needed in the U.S. health workforce?

2. What is the frequency of holistic review use in PA program admissions?

3. What is the relationship between PA program use of holistic review and proportion of URM matriculants?

4. How is an organizational culture that values diversity and inclusion manifested in holistic review practices associated with diverse student enrollment?

5. What specific admissions practices do programs that enroll high proportions of URM students use, and how are these practices supported?

Specifically, Chapter 2 describes the rationale for the need to improve URM representation within the PA and overall health workforce and makes the case for more research on interventions such as holistic review to increase URM participation in health professions education. The study presented in Chapter 3 assesses the extent to which PA programs use holistic review practices and examines the relationship between use of holistic review and proportion of URM matriculants. Finally, Chapter 4 provides a detailed report of a qualitative multiple case study designed to evaluate a conceptual model for holistic review utilization that supposes a relationship between an organizational culture that values diversity and inclusion and holistic review practices that effectively support diverse student enrollment.

It is important to point out that the term 'diversity' refers to the range of human differences including, in addition to race and ethnicity, gender, geography, national origin, language, religion, disability, sexual orientation, gender identity, and socioeconomic status (Association of American Medical Colleges 2013a). Also, the term 'inclusion,' which refers to appreciation for the inherent worth and dignity of all individuals, is often referred to in discussions of diversity (i.e., use of the collective term

'diversity and inclusion'), because inclusivity is considered necessary for diversity to flourish (American Association of Colleges of Nursing 2019). Although holistic review in admissions aims to promote greater overall diversity among students, due to recognition of the persistent and problematic lack of URMs in the health workforce, increasing numbers of racial and ethnic minority students is often a main focus (Coleman et al. 2014). The dissertation research explores the relationship between holistic review practices and URM student enrollment specifically. Consequently, references to diversity within this body of work primarily refer to racial and ethnic diversity.

Overview of Chapter

This chapter provides context for the research by reviewing the literature on holistic review and introducing the conceptualization of a relationship between organizational culture and effective holistic review practices. The chapter concludes with a description of Chapters 2, 3, 4, and 5 and their relevance to the research (see Figure 2).

Figure 2

Overview of the Dissertation Chapters
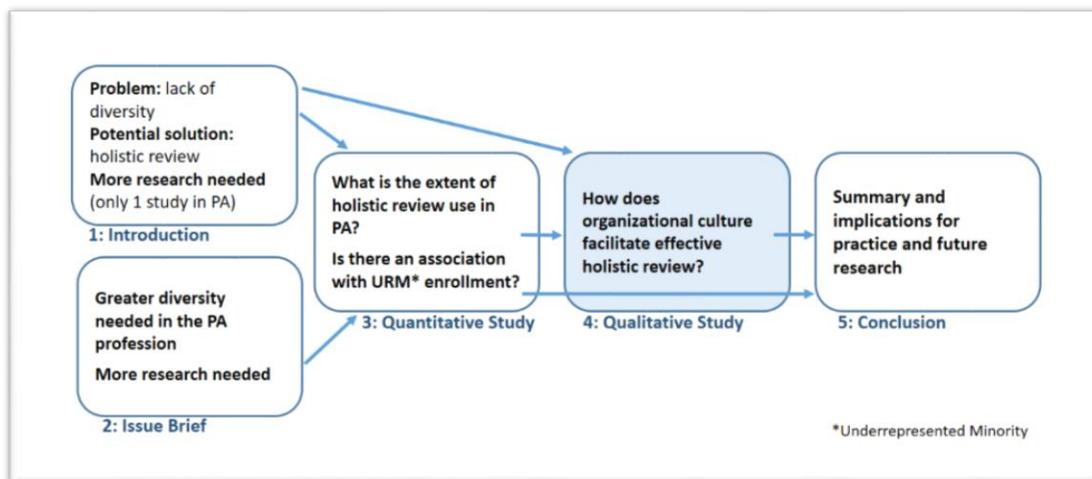
Holistic Review in Health Professions Admissions

Holistic review admissions practices have been of interest to the health professions since at least 2001 when the Institute of Medicine (IOM) published its report, "The Right Thing to Do, The Smart Thing to Do: Enhancing Diversity in the Health Professions," which summarized a symposium focused on diversity among healthcare professionals (Smedley et al. 2001). The report reviewed historical challenges to achieving a diverse health workforce, including inequities in the educational pipeline and legal decisions limiting race- or ethnicity-conscious admissions practices (Smedley et al. 2001). It also discussed the significant role minority healthcare professionals play in serving underserved patient populations and provided a framework for achieving diverse student enrollment through race-neutral admissions practices (Smedley et al. 2001). In 2007, the Association of American Medical Colleges (AAMC) initiated its Holistic Review Project, which incorporates tenets described in the IOM report, in order to promote development of admissions resources and practices to promote diversity in medical schools (AAMC 2013b). Other health professions educational organizations, for example the American Association of Colleges of Nursing (AACN) (2016) and the American Dental Education Association (ADEA) (2019), have since adopted components of the AAMC's approach to holistic review and, as noted above, currently many educational programs across health professions use holistic review in admissions. While the literature on holistic review is largely anecdotal and descriptive in nature, in recent years, more research has focused on the impact of specific holistic review practices. The

section below discusses the legal history associated with holistic review and provides an overview of findings from the existing literature.

Legal History of Holistic Review

For decades, educational institutions have struggled to achieve equity in admissions. Prior to the 1978 Supreme Court *Regents of the University of California v. Bakke* decision, which struck down "two-track" admissions policies, one strategy aimed at remedying past societal discrimination was to reserve a certain number of seats for URMs, who were evaluated separately (Coleman et al. 2014). The ultimate goal was to achieve enrollment of URMs reflective of the wider U.S. population (Coleman et al. 2014). Although the *Bakke* decision deemed allocating a particular number of acceptances to URMs unlawful, the Court left open the possibility for limited consideration of race when there is a "compelling interest." Over time, the rationale for diversity efforts has shifted from a goal to address past discrimination to a focus on the future benefits of a diverse student body (Coleman et al. 2014, p. 1). In the case of health professions, greater diversity is needed to better prepare the U.S. health workforce to meet the needs of the current population (Coleman et al. 2014; Sullivan 2004).

In a 2003 decision, *Grutter v. Bollinger*, the Supreme Court recognized the educational benefits of diversity as a compelling interest that could be pursued through the use of an individualized, holistic admissions process incorporating race as one of many factors considered. Subsequent Court decisions have affirmed this view but limit race-conscious practices to those that are "narrowly tailored" to attain specific diversity goals that cannot otherwise be achieved (Coleman et al. 2014). However, eight states,

including Arizona, have banned or partially banned public higher education admissions practices that consider race, ethnicity, or sex (Coleman et al. 2014). Therefore, publicly-funded health professions programs in these states cannot consider race or ethnicity when selecting applicants for admission, even for the purpose of meeting specific diversity-related objectives.

Race- or Ethnicity-neutral Admissions

While holistic review allows for limited consideration of race and ethnicity as one attribute among many (where legal) as a means to achieve defined diversity-related goals (e.g., achieving a mission to create a diverse learning environment), as noted previously, it places less value on academic metrics than traditional admissions practices. Therefore, it may achieve greater diversity without such consideration. Notably, in their balanced critique of the Medical College Admission Test (MCAT), a standardized academic metric used for admission to medical school, Eskander, Shandley, and Hanson (2013) conclude that the test may be more reflective of privilege than preparedness for present-day medical practice. In addition, although a strict focus on academic metrics may help ensure that admitted health professions students perform well academically, an evaluation of nonacademic attributes, such as interpersonal skills or the ability to relate to future patients, is needed to identify applicants who are also likely to also perform well in the clinical environment (Mahon 2013).

Holistic Review: State of the Science

A recent search done to assess the state of the literature on holistic review shows that efforts to adopt and study holistic review in health professions programs have

increased substantially in the last decade. On October 1, 2019, a search in PubMed

(Medline), CINAHL, and PsycINFO using the terms "holistic review" OR "holistic

admissions" identified 39 articles relevant to holistic review in the health professions.

One additional report was identified using Google Scholar. All but one paper was

published in the last 10 years, with 21 published in either 2018 (13) or 2019 (8). Eleven

articles included single-program descriptions of transition to holistic review and

evaluation of pre-post implementation outcomes, and four assessed the effect that using

various admissions criteria or strategies had on an individual school's interview pool

diversity or on its applicants' interview scores. Two – one involving dental schools and

one involving medical schools – examined changes in class diversity among programs

that participated in a national education association admissions workshop (Grbic et al.

2019; Wells et al. 2011).

     Several articles addressed potential holistic review barriers and facilitators, and

multiple authors mentioned the influence of organizational culture (Artinian et al. 2017;

Glazer et al. 2016; DeWitty 2018; Vick et al. 2018; Wros and Noone 2018). The majority

of papers focused on medical (17) or nursing (9) education, and three had both nurse and

physician authors (Artinian et al. 2017; Glazer et al. 2018; Urban Universities for

HEALTH 2014). Just two articles addressed PA education; one reported class diversity

outcomes associated with adopting holistic review (Felix et al. 2012), and the other

included holistic review as a strategy for evaluating "noncognitive" attributes in

admissions (Brenneman et al. 2018). Nearly a third of the articles (13) were

commentaries, editorials, or position papers (see Table 1).

When evaluating the literature on holistic review, it may be useful to consider typical steps in the admissions process. They generally include: 1) assessing applications to verify that prerequisite requirements have been met, 2) initially screening applications based on a program's selection criteria to determine who will be considered or invited for interview or offered acceptance, and 3) making final selection decisions – based on application review alone or application review in combination with an interview assessment – to determine who will be offered admission, placed on a waitlist, or denied admission. Some papers on holistic review focus on one or two specific steps of the admissions process; others discuss the overall process and associated outcomes.

Program descriptions/evaluations. Articles focused on different health professions that describe individual program transitions to holistic review provide some evidence to support its utility as a means to increase URM student enrollment. They also highlight differences in approaches and impact on diversity among students.

Nursing. Among nursing programs, pre- vs. post-implementation evaluations of holistic review reveal varied increases in the percentage of URM students. For example, at one nursing school, immediately following adoption of holistic review, the percentage of African Americans accepted remained constant; however, the percentage of Hispanics/Latinos admitted increased from 8.2% to 14.7% (Zerwic et al. 2018). Two years later that percentage had grown to 18.9%, and the program did not experience any significant changes in the average grade point averages (GPAs) of admitted students, two-year graduation rates, or first time National Council Licensure Examination for Registered Nurses (NCLEX-RN) pass rates (Zerwic et al. 2018). More modest gains in

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URM enrollment have also been achieved by other nursing schools, for instance, an increase from 11% URM matriculants to 16% at one school three years after implementing holistic review (Wros and Noone 2018), and an increase from 15% to 18% URM matriculants at another the year holistic review was initiated (Roach et al. 2019).

Nursing program descriptions show that different holistic review practices can been successful. At their Ohio nursing school, for example, Wagner and colleagues (2019) implemented interviews, using the Multiple Mini Interview (MMI) model, to promote selection of a diverse group of candidates whose attributes aligned with their school's values and mission. Their approach led to admitting higher percentages of URM, male, and first-generation college applicants than would have been admitted through a process focused solely on quantitative metrics such as GPA (Wagner et al. 2019). Faculty at an Oregon school of nursing also adopted interviews as a means to promote holistic evaluation of applicants; however, due to feasibility issues, they conducted group interviews involving three faculty members and five applicants (Roach et al. 2019). Although the approach to interviews was different, results were similar in that the school experienced a 3% increase in the percentage of admitted URMs (Roach et al. 2019).

Medicine. In their article discussing their medical school's implementation of holistic review, Witzburg and Sondheimer (2013) reported that the transition yielded an 8% increase in the percentage of URM students (from 12% to 20%) and that academic metrics of admitted students slightly increased. In an attempt to broaden the group of interviewers who participated in the applicant selection process, which is a strategy to enhance holistic review, a New Mexico medical school invited off-campus rural and

community physicians to interview candidates using videoconferencing technology (Ballejos et al. 2018). As a result, although all interviewees had at least one face-to-face interview, some also had a videoconference interview (Ballejos et al. 2018). The groups of candidates selected using each approach were similarly diverse; thus, videoconferencing appeared to be an innovative and equitable way to expand the pool of interviewers (Ballejos et al. 2018).

Physician assistant. In the one evaluation involving a PA program, prior to holistic review, applicants were interviewed in groups and assessed using a "performance approach" based on evaluation of grade point average (GPA), an essay, and the interview (Felix et al. 2012). Criteria for ranking applicants included ability to succeed in the program, appropriate interpersonal skills, and whether the interviewer would like to have the applicant as a colleague (Felix et al. 2012). To facilitate holistic review, the program eliminated the interview and adopted a holistic scoring system based on evaluating applicants' academic metrics as well as their personal characteristics – including race/ethnicity, cultural background, and socioeconomic status – and personal attributes such as leadership, motivation, tolerance, and capacity for teamwork. Transition to the holistic approach was associated with a 361.5% increase in the *number* of URMs accepted, which resulted in matriculating a class comprised of 12.4% URMs (Felix et al. 2012).

Impact on diversity of interviewee pool. Comparisons of numbers of URMs selected for interview when evaluation of nonacademic attributes are and are not incorporated into the initial application screening support use of these attributes in

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achieving diversity. Grabowski (2018) compared the applicants selected for interview at a Michigan medical school over five admissions cycles using the school's holistic review process to an equal number of applicants who would have been selected based on evaluation of academic metrics alone. The school's initial screening (to determine who will be selected for interview) involves two screeners independently assessing applications for academic preparedness and experiences and attributes aligned with the school's mission, including service orientation, ability to work with others, and adversities overcome; race and ethnicity are not considered (Grabowski 2018).

Study results showed that holistic review yielded a significantly higher percentage of female, URM, first-generation college, and self-identified disadvantaged applicants selected for interview (Grabowski 2018). Harrison (2019) completed a very similar study at a Texas medical school and obtained comparable results. Similarly, an analysis of applicant data from one admissions cycle at a New Jersey dental school found that academic metrics-based selection for interview, without consideration of other factors, favored majority, traditional, non-URM applicants (Chaviano-Moran et al. 2019).

Effect of blinding. Gay and colleagues (2018) compared medical school interview scores when interviewers had access to candidates' academic metrics to scores when interviewers were 'blinded' to academic metrics. Although the interviewers were participating in the school's holistic process, Gay et al. (2018) found a stronger positive association between interview scores and undergraduate GPA when interviewers were able to review academic metrics than when they were blinded. Consequently, they concluded that withholding academic metrics from interviewers may facilitate more

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independent assessment of candidates' nonacademic attributes (Gay et al. 2018, p. 151). Since the primary means by which holistic review promotes diversity is through consideration of nonacademic factors, blinding interviewers may also help facilitate greater diversity among interviewed candidates chosen for acceptance.

      Admissions workshops. Grbic et al. (2019) examined the diversity among students enrolled in 58 medical schools that had participated in the AAMC's holistic review in admissions workshop and compared it to student diversity in 76 schools that had not. They found that, among schools that engaged in a workshop, the mean percentages of Hispanic/Latino and first-generation college matriculants as well as the overall racial/ethnic diversity of matriculants (as measured by a diversity index) was significantly higher after workshop participation (Grbic et al. 2019). Moreover, these diversity measures were higher than the same measures in schools that did not participate in a workshop. However, schools that did not participate had a higher mean percentage of African American matriculants, and the percentage of African American matriculants among workshop participants did not significantly increase (Grbic et al. 2019).

      Wells and colleagues (2011) assessed the changes in percentages of URM students in dental schools after participation in an American Dental Education Association's Admissions Committee Workshop aimed at helping schools explore their admissions processes and develop practices to promote diversity. Over the course of five years (2004-2008), fifteen dental schools participated. Among schools for which data was available (13 schools), 76.9% (10 schools) experienced increases in the percentage of URM students in the years following workshop participation (Wells et al. 2011). Taken

together, the examinations of admissions workshop engagement show a net benefit with regard to diverse student enrollment; however, inconsistent outcomes highlight the fact that, in addition to significant variation in admissions practices across programs, numerous factors likely influence the effectiveness of holistic review. Notably, Wells et al. (2011) found that dean participation in the admissions workshop appeared to positively influence gains in URM enrollment.

Barriers and facilitators. Several articles about holistic review describe potential barriers and facilitators. Glazer et al. (2016) conducted focus groups involving 41 nursing school deans and designees to identify benefits and challenges associated with holistic review and develop strategies to overcome challenges. Study findings revealed several barriers including lack of knowledge of holistic review, fear of backlash associated with turning away academically qualified applicants, and uncertainty about legal parameters (Glazer et al. 2016). As an aside, although the recent legal challenge to Harvard University's holistic admissions process was upheld October 1, 2019 by the U.S. District Court in Massachusetts, the decision will be appealed (Jaschik 2019). Thus, ongoing uncertainty may further exacerbate apprehension about what practices are legally defensible. Additionally, concern about the fairness of holistic review has been raised in other papers. For instance, several students surveyed by Zerwic et al. (2018) after they were admitted to nursing school through a newly-implemented holistic review admissions process expressed concern about an overemphasis on diversity that might disadvantage nonminority applicants. In his editorial on holistic admissions in medical schools, Sklar (2019, p. 454) discussed similar sentiments, noting that holistic review may be perceived

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as unfair, particularly among applicants who are not accepted despite high academic metrics. Based on their meta-analytic review assessing the ability of subjective rater judgments to predict measures of academic, clinical, and employment success, Kreiter and colleagues (2018) rejected holistic review outright as an invalid substitution for superior mechanical/statistical approaches to predicting applicants' future performance. It should be noted, however, that Kreiter et al. (2018) did not account for subjectivity and bias in rater judgments of performance, nor did they address the main outcome that holistic review aims to achieve – namely, greater diversity among enrolled students.

In an effort to address challenges associated with holistic review, nursing dean focus group participants in Glazer et al.'s (2016) study identified several strategies including: obtaining buy-in from administrators, faculty, and the community; developing a conceptual model to guide holistic review utilization; and providing faculty training. University leaders who contributed to another paper focused on strategies to facilitate effective adoption of holistic review also recommended developing a core conceptual framework. In addition, they advised establishing resources to support students academically and financially (Artinian et al. 2017). Furthermore, they discussed best practices – for example incorporating essay questions related to a program's mission into admissions applications – and recommended further research on nonacademic metrics associated with student success that could be evaluated as part of holistic review (Artinian et al. 2017, p. 5). Finally, they noted that evaluation of holistic review outcomes, for instance impact on the learning environment, may further promote its use (Artinian et al. 2017). Others have discussed comprehensive approaches to increasing

diversity among students that include supporting holistic review through outreach and recruitment aimed at building a diverse pipeline of students prepared for admission to health professions programs (Addams et al. 2010; Coleman et al. 2014; Glazer et al. 2018).

As part of their evaluation of holistic review in an undergraduate nursing school, Wros and Noone (2018) provided a list of lessons learned that may also help facilitate successful implementation. Based on their experience, they made a number of recommendations including: identifying early adapters, monitoring student progress, and identifying areas for improvement through frequent evaluation of the admissions process (Wros and Noone 2018). Overall, it appears that a variety of strategies may help programs overcome difficult challenges associated with using holistic review. In addition, references to academic support and outreach and recruitment suggest that holistic review should be supported by additional diversity-related efforts (Addams et al. 2010; Artinian et al. 2017; Glazer et al. 2018).

Organizational culture. To date, organizational culture has not been explicitly examined in the holistic review literature, although it has been briefly mentioned as a potentially important consideration. In their review of multiple interventions to enhance diversity in medical education, Vick et al. (2018, p. 55) noted that how holistic review – itself a neutral tool – is used depends on organizational leadership. They further stated that culture is among the principles known to facilitate increased diversity (Vick et al. 2018, p. 57). DeWitty (2018) contended that culture defines holistic review, just as it defines any other major organizational change. Moreover, comments from the focus

groups conducted by Glazer et al. (2016, p. 13) revealed that at least one nursing dean believes that holistic review requires "…a culture change from both the public and academia…" imbued by appreciation for excellence that is not solely defined by GPA. Wros and Noone (2018, p. 216) also reported that holistic review "…represents a culture shift away from predominantly (or often exclusively) valuing academic metrics…" Finally, in their diversity and inclusion framework for medical education, Nivet and Castillo-Page (2016) addressed the need for a culture that values diversity and inclusion to support a shift toward pursuing diversity – through holistic review and other institutional practices – as an essential aspect of high-quality education. These perspectives suggest that organizational culture may need to be addressed to facilitate admissions practices that effectively promote diversity.

Current State and Significance of the Dissertation Research

Although holistic review has been widely adopted across health professions programs (Urban Universities for HEALTH 2014), achieving meaningful increases in the proportion of URMs in many health professions remains elusive (Acosta et al. 2017; Slapar et al. 2018; Snyder et al. 2018). This review of the literature indicates that holistic review and specific holistic review practices, such as evaluating initial applications based on consideration of nonacademic as well as academic criteria, may successfully increase diversity among students admitted to health professions programs. However, much of the evidence for the effectiveness of holistic review is based on pre- vs. post-implementation evaluations involving only single programs, which is a design typically considered weak its ability to demonstrate causal connections between an intervention and outcomes.

Assessment of holistic review is further complicated by the fact that programs use a variety of practices and criteria. Research on the impact of workshops across multiple health professions programs is promising; however, it does not address how programs use the training workshops provide. Finally, factors such as organizational culture, that may be critical to success, have not been specifically evaluated. The research presented in this body of work is unique in that it examines the potential association between holistic review and URM student enrollment across all PA programs in the United States and explores the role organizational culture plays in effective holistic review through the lens of an initial conceptual model.

Conceptual Model

The conceptual model is based on an understanding of the connections between an organization's culture, desired outcomes, and practices. For the dissertation research examining the influence of culture on holistic review, an organizational culture that values diversity and inclusion (or 'diversity culture') is depicted as precondition for a program's focus on outcomes aligned with diversity and for enacting practices that achieve significant URM student enrollment (see Figure 3).

Organizational Culture

Researchers have studied the concept of organizational culture since the 1930s. However, it wasn't until the 1980s that studies began to link organizational culture with performance and outcomes (Scott-Findlay and Estabrooks 2006); for example, the relationship between an organization's safety culture and its accidents. In their 2006 review, Scott-Findlay and Estabrooks (2006) found that the concept of organizational

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culture has been used to study and better understand a variety of issues relevant to

nursing practice, including managerial decision-making, research utilization, job

satisfaction, and patient-focused care. Researchers have also studied the influence of

organizational culture in nursing academic environments; McNeal (2003) examined the

impact of organizational culture on African American nurse faculty satisfaction, and

Taplay et al. (2014) studied the role of organizational culture in determining how

simulation is incorporated into nursing curricula. Moreover, understanding organizational

culture is considered essential to addressing complex challenges in higher education

(Tierney 2011).

Although the theoretical underpinnings of studies on organizational culture come

from a variety of perspectives, research in nursing has drawn most heavily from Schein's

conceptual framework (Scott-Findlay and Estabrooks 2006; Taplay et al. 2014). Schein

(2017) defines organizational culture as a pattern of basic assumptions shared by a group

and established over time in response to managing internal and external problems (p. 6).

According to Schein (2017), these basic assumptions influence attitudes and impact

behavior. An organization, from Schein's perspective, is a group with stable membership

that engages in the shared learning that forms the foundation for culture (Schein and

Schein 2017).

Schein (2017) posits that organizational culture exists at three levels: basic

underlying assumptions (i.e., underlying values), espoused beliefs, and artifacts. The

deepest level of culture consists of the basic assumptions that guide attitudes and actions.

Culture is ingrained at this level and often unconscious or implicitly understood (Schein

and Schein 2017). Basic assumptions are manifested in the next levels of culture, espoused beliefs – which may include stated values and goals – and artifacts. Artifacts, which include visible displays (e.g., photos and artwork), constitute the most superficial level of culture (Schein and Schein 2017). While some also view leadership as an expression of culture (Tohidi and Jabbari 2012; Zheng et al. 2010), Schein (2017) states that leadership serves to manage culture. Leaders that create new organizations create new cultures; however, once an organization's culture is established, it defines what types of leadership will be valued and tolerated (Schein and Schein 2017, p. 125).

Although artifacts and espoused beliefs provide insight into an organization's underlying culture (i.e., the basic assumptions that guide behavior), Schein (2017) notes that these aspects of culture must be carefully interpreted, because they are not always congruent with basic assumptions; for example, a mission statement (which is an espoused belief) may promote diversity despite the fact that valuing diversity is not inherent within the culture. Tensions between levels of culture may be reflected in discrepancies between espoused beliefs and actions (Schein and Schein 2017). To illustrate this point, Tierney (2011) uses the example of a college that proclaims faculty teaching skills are its priority but bases promotion decisions on research productivity. Because the influence of organizational culture on behavior primarily results from the basic assumptions that form its deepest level, a key aim of studying culture is to gain appreciation for these basic assumptions, which are reflected in attitudes, beliefs, and behavior (Schein and Schein 2017). The conceptual model for the dissertation research

adopts Schein's concept of organizational culture as a means to assess culture and subsequently evaluate its influence on educational program outcomes and practices.

Figure 3

Original Conceptual Model Depicting the Relationships between Organizational Culture, Program Outcomes, and Program Practices
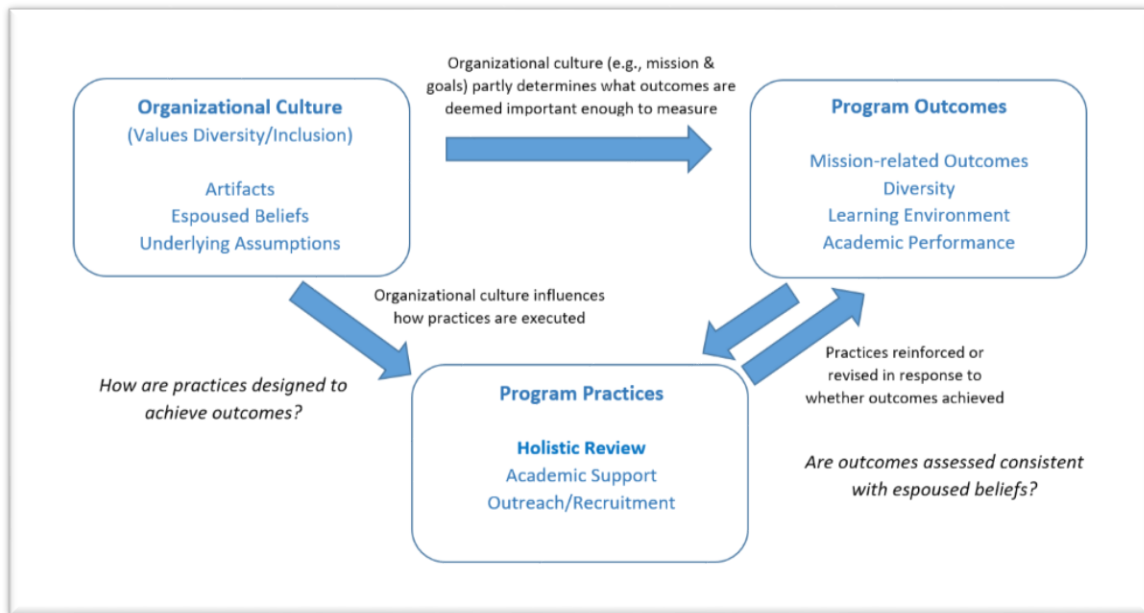
Organizational culture, outcomes, and program practices

According to Schein (2017), espoused beliefs include stated organizational goals (e.g., a mission statement). In order to assess organizational performance, goals must be translated into measurable outcomes (Zheng et al. 2010). Therefore, a direct relationship exists between a program's goals (which are manifestations of culture) and the outcomes it measures to determine whether goals have been achieved. In addition to the hypothesized direct relationship between organizational culture and outcomes, organizational culture is hypothesized to have an indirect effect on outcomes through its

influence on program practices. The influence of culture on practices, including holistic review, manifests in attitudes, behavioral norms, and actions that affect the ways that practices are designed and executed (Souza and Fineli 2016). Additionally, the model depicts a recursive relationship between program practices and outcomes to demonstrate that practices are typically reinforced or revised in response to whether or not they achieve desired outcomes.

To date, as noted earlier, there is minimal empirical evidence linking culture to holistic review practices. The proposed framework is consistent with existing recommendations for holistic review, which include providing academic support for students beyond the admissions process, supporting admissions efforts through outreach and recruitment, and evaluating outcomes as a means to improve the admission process (Glazer et al. 2016; Glazer et al. 2018; Scott and Zerwic 2015; Wros and Noone, 2018). This body of research will contribute to an understanding of the role of organizational culture in achieving the goals of holistic review.

Overview of the Dissertation Chapters

The five chapters of this dissertation establish the research problem and weave together literature review and a body of mixed methods research to explore factors that may contribute to utilization of holistic review practices in educational program admissions that effectively increase URM participation. Chapter 1 introduces the research problem, provides an overview of the literature related to holistic review, and describes the conceptual model used in the dissertation research. It establishes the significance of

each component of this body of research to a more integrated understanding of holistic review practices, their antecedents and outcomes.

Chapter 2 consists of an issue brief that further discusses the issue of diversity in the PA profession and offers recommendations to address the problem. To inform the brief, a review of the literature on the influence that URMs have on patient care was conducted, and evidence related to a variety of issues relevant to the problem of insufficient diversity among PAs was sought. These issues include: trends in PA education, the role PAs play in caring for medical underserved patients (who are likely to derive the most benefit from a diverse health workforce), and barriers URMs face accessing the health professions. The literature was also reviewed to identify potential solutions to the problem. To create the brief, the most pertinent information was combined to provide the rationale for a more diverse PA workforce, discuss challenges that must be overcome, and advocate for the PA community to take action. Major recommendations that emerged from existing literature included: reaching out to diverse communities to promote the PA profession and support individuals who may be interested in a PA career, involving diverse groups of individuals on PA program admissions committees, supporting adoption of a PA program accreditation standard requiring PA programs to address diversity, educating PA program faculty on how to promote diversity in the learning environment, creating more holistic admissions processes, and conducting more research to inform ongoing efforts to address the issue.

Chapter 3 reports the findings of a quantitative study conducted to assess the frequency of holistic review use across all PA educational programs in the United States

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and examine the association between use of holistic review and URM student enrollment. Data for the study were obtained from the 2017 Physician Assistant Education Association (PAEA) annual PA Program Survey, which attained a 99.1% response rate for questions related to holistic review. Frequencies were computed to determine the extent of holistic review utilization by PA programs. Mann-Whitney tests were used to compare the percentage of URM students in programs using and not using holistic review, and Spearman correlation coefficients were used to assess the correlation between using various elements of holistic review and percentage of URM students. Finally, binary logistic regression was used to estimate the odds of URM student enrollment, based on whether or not a program was using holistic review and controlling for regional population demographics (which are known to be associated with URM enrollment) (Coplan et al. 2018).

Overall, there was a modest association between using holistic review and program percentage of URM students; however, some programs employing holistic review had substantially higher percentages of URM students than others. This finding served in part as the basis for the research presented in Chapter 4, which examines holistic review practices in PA programs with high URM enrollment (relative to the majority of PA programs that use holistic review) and explores the influence of organizational culture.

Chapter 4 is the report of the core dissertation research, an analysis of holistic review practices in two PA programs using a qualitative multiple case study approach. The main objective was to explore how an organizational culture that values diversity and

inclusion manifests in holistic review practices that achieve diverse student enrollment. Selection criteria were based on the conceptual model, and PA programs that met criteria were identified based on responses to the survey used in the Chapter 3 study. Criteria were that programs must have: 1) indicated that they use holistic review, 2) responded *strongly agree* or *agree* to three questions in the survey assessing program commitment to diversity, 3) reported that holistic review resulted in increased racial and ethnic diversity among students, and 4) had a proportion of URM first-year students that was at or above the 90th percentile for all programs using holistic review (accounting for a program location's regional population demographics). Data from each case was collected from multiple sources: 1) texts and artifacts, 2) informal and formal non-participant observations, 3) faculty and staff interviews, and 4) a focus group of first-year URM students at each program.

Analysis was conducted using a codebook derived from the conceptual model and created *a priori* to facilitate directed content analysis (Colorafi and Evans 2016). Analytic memos recorded reflections on data meaning and interpretation (Miles et al. 2014), were also used, and the approach to analysis of data from the first case was repeated for the second case in order to identify consistent patterns across cases (Miles et al. 2014; Yin 2018). Finally, data from each case were arranged into matrices and analyzed for similarities and differences that served as the basis for propositions for further testing (Miles et al. 2014). Study results supported the major relationships proposed in the conceptual model, that is, the relationships among organizational culture, holistic review practices, and outcomes. Additionally, study findings suggested that the outcome of

diverse classes of students influences, or strengthens, organizational culture that values diversity and inclusion. Therefore, depiction of a feedback loop between outcomes and organizational culture was added to the model.

Chapter 5, the final chapter of this dissertation, summarizes and analyzes key results from the issue brief, examination of the frequency of holistic review use in PA programs and its association with URM enrollment, and the qualitative multiple case study analysis. Contributions to the state of the science on holistic review use in admissions are highlighted and recommendations for future research are discussed.

Table 1

Review of Articles on Holistic Review

Authors Year	Type (topic)	Setting; sample	Pertinent findings/Main points
Nursing			
Roach et al. 2019	Pre-post evaluation (adopted holistic review [HR] and group interviews)	School of Nursing (SON); 210-400 applicants assessed in each year (2014-2015)	Use of group interviews and HR associated with increase in admitted URMs[a] (15% to 18%)
Wagner et al. 2019	Pre-post evaluation (incorporated MMI[b] interviews into HR)	College of Nursing (CON); 341 applications assessed	Use of MMI and HR associated with increase % of admitted URM, 1st gen college, and out-of-state applicants
Wros and Noone 2018	Pre-post evaluation (adopted HR)	SON; sample size not provided, years assessed 2013-2016	HR associated with increase in admitted URMs (11% to 16%)
Zerwic et al. 2018	Pre-post evaluation (adopted HR)	Bachelor of Science in Nursing (BSN) program; 159-169 admitted students evaluated in each year (2012-2016)	HR associated with increase in admitted Hispanics/Latinos (8.2% to 18.9%)
Barton et al. 2017	Program evaluation (holistic preadmission metrics associated with student success)	2nd-degree nursing program; 86 students' preadmission testing data	Unsuccessful students had different scores on Hogan Personality Inventory and Hogan Developmental Survey
Glazer et al. 2016	Focus group study (HR barriers and strategies)	Setting not provided; 41 nursing deans and designees	Barriers to HR adoption (e.g., need for support from leaders) and potential solutions identified (e.g., development of model for HR)
Scott and Zerwic 2015	Program description (implemented HR)	CON; sample not provided	3 applicants admitted who would not have been with prior focus on academic metrics; ongoing challenges identified (e.g., need for resources to support students)
DeWitty 2018	Editorial	NA	HR should be driven by each school's mission and, in order to be accepted, aligned with organizational culture

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Glazer 2015	Commentary	NA	HR should be carefully examined and adopted by nursing schools to improve diversity
Physician			
Aibana et al. 2019	Pre-post evaluation (adopted HR for resident selection)	Residency program; 1,276 pre-HR applications (2016), 897 post-HR applications (2018)	% URM matriculants increased from 12.5% to 31.7%
Grbic 2019	Retrospective quantitative study (diversity among students at schools who participated in HR workshop)	American Medical College Application Service (AMCAS) data (2006-2016); 58 schools that participated in HR workshop, 76 that did not	Schools that participated in HR workshop: 1) experienced increases in % Hispanic/Latino and 1st gen college students, 2) had lower % African American students compared to non-participant schools
Harrison 2019	Retrospective quantitative study (HR vs. academic-focused review)	Medical school; 4643 applications (total from 2011-2015)	HR yielded statistically higher % of women, URM, 1st gen college, and lower SES applicants selected for interview; 2011 HR enrollees with med school board exam scores lower than national average, 2012 and 2013 HR enrollees with scores equal to national average
Ballejos et al. 2018	Innovation evaluation (videoconference applicant interviews conducted by off-campus rural and community physicians)	Medical school; 752 total interviews assessed (total from 2014-2016)	Characteristics of applicants selected similar between videoconference and face-to-face interviews
Gay et al. 2018	Quantitative study (interview scores comparison, interviewers with and without access to academic metrics)	Medical school; 667 interviews 2012 (un-blinded), 578 interviews 2013 (blinded)	Stronger association between interview score and undergraduate GPA when interviewers un-blinded
Grabowski 2018	Retrospective quantitative study (HR vs. academic-focused review)	Medical school; 2773 applications (total from 2011-2015)	HR yielded statistically higher % women, URM, 1st gen college, and self-identified disadvantaged applicants selected for interview

Kreiter et al. 2018	Meta-analytic review (assessed subjective rater judgment association with measures of performance [e.g. academic, clinical, work success])	14 studies reviewed, 6 were meta-analytic studies summarizing 292 individual studies from medical education and wider literature	Traditional interview has low reliability to predict performance; use of holistic review is not a valid alternative to mechanical/statistical approaches to predict performance
Sims and Lynch 2016	Innovation description (patients incorporated into interview)	Medical school; 375 interviewees participated	Patient experience demonstrated school culture, well-received by admitted students
Grbic et al. 2015	Validation study (assessed applicant socioeconomic indicator)	American Medical College Application Service data, 43,442 applications (2012)	Parental education (E) and occupation (O) [EO] indicator could be applied to 89% of applications; the lower the EO category, the stronger the association with 6 socioeconomic disadvantage indicators
Stratton and Elam 2014	Retrospective quantitative study (predictors of underperformance)	Medical school; 537 students	Predictors associated with increased odds of underperformance included: lower undergrad GPA, entered med school via BS/MD track, $\geq$ 31 y/o, non-unanimous admissions committee admission
Witzburg and Sondheimer 2013	Pre-post evaluation (adopted HR)	Medical school; 5 classes of students (2008-2012)	% URM students increased from 12% to 20%; average academic metrics of admitted students slightly increased
Sklar 2019	Editorial	NA	HR can meet diversity goals if admissions committee members understand history of bias and confront their own biases; HR also requires larger institutional commitment to diversity

Thomas and Dockter 2019	Commentary	NA	Current challenges to affirmative action policies may cause concern for med schools that use HR; meds schools must remain committed to diversity-related efforts
Vick et al. 2018	Review of efforts to enhance diversity in med schools	NA	Organizational leadership and commitment to diversity needed to improve diversity and cultivate community-responsive health care
Moynahan 2018	Commentary	NA	Overreliance on medical school board exam scores for residency selection threatens holistic admissions and student well-being
Conrad et al. 2016	Commentary	NA	HR can help med schools be "responsive to and informed by broader social context" (p. 1472)
Mahon et al. 2013	Commentary	NA	HR contributes to the shift to competency-based medical education
Kirch 2012	Comments on prior article	NA	MMI and HR can help assess nonacademic attributes that physicians need to practice patient-centered care
Dental			
Chaviano-Moran et al. 2019	Retrospective quantitative study (academic-focused review)	Dental school; 2,157 applications (2018)	Academic-focused review of applications favors majority, traditional, and non-URM applicants
Aalboe et al. 2014	Quantitative study (timing of application submissions)	Dental school; 1,673 applications (2011)	URMs significantly more likely to apply later in admissions cycle than non-URMs by factor of 63%
Wells et al. 2011	Evaluation of admissions workshop	Dental schools; 15 schools participated (data available for 13)	76.9% (10 schools) had increase in % URM students in years following workshop

Price et al. 2010	Pre-post evaluation (had workshop and adopted HR)	Dental school; total sample not provided	Number of URMs accepted increased from 2 to 12
Physician Assistant			
Brenneman et al. 2018	Position paper	NA	HR is one approach to assessing "non-cognitive" attributes; recommend developing validated measures to assess nonacademic attributes
Felix et al. 2014	Pre-post evaluation (adopted HR)	PA program; 882 applications in pre-HR cycles (2009, 2010), 1,781 applications in post-HR cycles (2011, 2012)	Number of URMs accepted increased 361.5% (resulted in matriculating class with 12.4% URMs)
Other Professions			
Choi et al. 2018	Literature review (assessed nonacademic factors used in admissions)	47 studies reviewed; assessed for relevance to **pharmacy** education	California Critical Thinking Skills Test significant predictor of clerkship and practice-related outcomes; unclear how pharmacy schools assess applicant communication skills; academic metrics not nuanced enough to predict success for entire pharmacy curriculum
Roberts and Ostreko 2018	Commentary	NA	Reliance on GRE for **graduate psychology** programs should be reduced; more holistic admissions needed to increase diversity
Wise et al. 2017	Position paper based on efforts of **Physical Therapy** (PT) Diversity Task Force	NA	Ongoing work needed to increase diversity in Doctor of PT (DPT) education; HR is 1 way to improve diversity
Okorie-Awe et al. 2015	Letter to editor	NA	Racial diversity of **pharmacy** workforce has not substantially increased in last decade; HR should be adopted to improve diversity

Multiple Professions			
Artinian et al. 2017	Article describing strategies to facilitate holistic review	University leaders convened by Coalition of Urban Serving Universities	Health professions educators can use HR best practices; a conceptual model for HR is needed; additional resources and legal guidance may facilitate HR
Glazer et al. 2018	Article describing multifaceted initiative, including HR, to increase diversity HR (some pre-post HR adoption evaluation)	Academic Health Center (AHC); multiple health professions involved	% of African American AHC students remained constant pre-post initiative; after CON adopted HR: % URMs admitted increased from 5% to 15%, % 1st gen college students admitted increased from 12% to 29%, % URM faculty increased from 16.7% to 26.3%
Urban Universities for HEALTH 2014	National survey	228 public-funded health professions programs	Most programs reported using HR (91% of med schools, 93% of dental schools, 78% of pharmacy schools, 47% of BSN programs); HR use associated with reported increases in student diversity

[a]URM = Underrepresented Minority
[b]MMI = Mutliple Mini Interview

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CHAPTER 2

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The Need for Greater Diversity in the PA Profession

There is consensus among leading organizations committed to improving the

health of the U.S. population that a diverse health workforce is needed to combat

pervasive health and health care disparities that disproportionately impact

underrepresented minority (URM) and underserved populations.[1,2,3] However, like many

other health professions, the PA profession has failed to adequately respond to calls from

the Institute of Medicine (IOM), the Health Resources and Services Administration

(HRSA), and others to increase URM representation among its ranks.

Definition: Underrepresented minorities, the underserved and diversity

The HRSA Bureau of Health Workforce defines **underrepresented minorities** as
individuals from racial or ethnic backgrounds that are inadequately represented in a
profession, relative to the numbers of individuals with that racial or ethnic background
in the general population. Races and ethnicities considered underrepresented in health
professions include Black or African American, Hispanic, Native Hawaiian or Pacific
Islander, and American Indian or Alaska Native.[8] **Diversity** in the health professions
encompasses underrepresented minorities as well as those from rural areas and poor
socioeconomic backgrounds. Individuals from these groups are often
underrepresented and underserved.[9]

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A lack of diversity negatively impacts the educational environment and ability of PA programs to equip students entering the profession with the skills necessary to provide culturally competent patient care.[1,4,5] Potential downstream effects on care access, quality, and cost are substantial, particularly in light of the rapidly increasing diversity of the U.S. population. Minority health care providers are more likely than non-minorities to serve minority and underserved communities[3] and, under a variety of circumstances, provide a higher quality of care to minority patients.[3,6,7]

The need for diversity in all health professions

At the request of Congress, an Institute of Medicine (IOM) committee systematically reviewed more than 100 studies that examined the quality of health care for racial and ethnic minorities, accounting for factors related to access, like insurance status and income.[3] In its 2002 report, "Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care," the committee described widespread disparity in the care received by racial and ethnic minorities and concluded that bias, prejudice, and stereotyping were among the many factors contributing to inequities. The committee recommended educating health care providers on cultural differences and increasing the number of minority health care providers.[3]

In 2004, the Sullivan Commission on Diversity in the Healthcare Workforce released a report, "Missing Persons: Minorities in the Health Professions," that promoted increasing diversity in health professions education as a matter of social justice and a means to strengthen cultural competence and improve the health of minorities and non-minorities alike.[1] A subsequent 2006 HRSA report based on a review of 55 studies

provided evidence to support the Sullivan's Commission's recommendations.[6] Among other benefits to minorities, the HRSA report concluded that, "minority patients tend to receive better interpersonal care from practitioners of their own race or ethnicity, particularly in primary care and mental health settings."[6]

Research published since 2006 continues to support an ongoing need for greater diversity in the health professions. While some studies suggest that patient-provider race and ethnicity discordance has little or no influence on care quality,[10,11,12] others show that concordance positively impacts communication, timely receipt of necessary interventions, adherence to medications, and other aspects of care.[13,14,15,16,17] Medication non-adherence alone costs the U.S. between $100 and $300 billion in avoidable health care expenses;[18] thus, a more diverse health care workforce may also reduce costs.

A 2015 systematic review of 15 studies on implicit racial and ethnic bias in health care found that bias consisting of negative attitudes toward people of color is prevalent among health care professionals and, in some cases, has a negative impact on patient care.[19] More minority health care professionals are therefore needed not only to care for URM and underserved patients, but to serve as positive role models within the health care system. Additionally, a greater proportion of minority health professionals in the workforce may encourage research that focuses on more diverse populations and subsequently improves understanding of social, cultural, and economic factors that impact patient heath.[20,21]

Why diversity in the PA profession must be addressed now

PAs play a significant role in providing care to underserved communities.[22] They are more likely than physicians to practice in rural communities and more likely to care for patients who have Medicaid or pay out-of-pocket.[23,24] In this regard, the PA profession remains true to its historical mission to increase access and thereby improve care for medically underserved patients.[25] In 2010, the number of practicing PAs was projected to increase nearly 72% by the year 2025.[26] At the same time, the racial and ethnic diversity of the U.S. is rapidly shifting such that, within 30 years, whites will no longer make up a majority of the U.S. population.[27] This time of rapid change represents an opportunity for PAs to generate significant progress toward achieving national health goals focused on achieving equity in health care, eliminating health disparities, and improving the health of the population.[28] Yet, in order to optimally care for a diverse patient population, we need a diverse workforce.[1,2,3]

Despite the increasing population diversity, for more than a decade the percentage of URM students entering and graduating from PA programs has been stagnant.[29] According to the U.S. Bureau of Labor and Statistics, between 2000 and 2016, the percentage of African Americans in the U.S. labor force remained constant at 12% while the percentage of Hispanics increased from 11% to 17%.[30,31] During the same period, the percentage of African American and Hispanic PA students decreased from 6.2% to 3.9% and from 7.0% to 6.5% respectively.[32,33]

Until the 1990s, a higher proportion of URMs entered PA programs than entered other health professions programs;[34] however, this is no longer true. During the 2016-

2017 academic year, while nearly 25% of students admitted to PA schools had non-white

backgrounds, just 3.1% were African American; 9.2% were Hispanic or Latino; < 1%

were Hawaiian, Pacific Islander, American Indian or Alaska Native; and 3.1% identified

as being multiple races.[35] Additionally, as in prior years, the ratio of percentages of

students accepted to PA school compared to percentages that applied was lower for

minorities than the 1.13 ratio for whites; for minorities it ranged from 0.96 for those of

multiple races to 0.50 for African Americans.[35,36]

For underrepresented minority students, program attrition is another important

factor. The 2016 Physician Assistant Education Association (PAEA) Programs' Report

revealed that while American Indian or Alaska Native students had a higher graduation

rate than white students (96.0% versus 95.2%), Hispanic, Native Hawaaiian or Pacific

Islander, and African American students had lower graduation rates (92.8%, 91.3%, and

85.0% respectively).[33] This compares to graduation rates of between 96.7% to 90.7% for

URM students and 94.1% for white students in 2011.[37]

Obstacles for underrepresented minority and low income students

Disparities in opportunity and high-quality K-12 education pose significant

challenges for some URM, low income, and disadvantaged students seeking higher

education.[38] Compared to their counterparts, these students may need additional training

and intensive academic support to meet the prerequisite requirements for health

professions programs.[38] Physician assistant programs have in fact identified low

undergraduate GPA, poor preparation in the sciences, and low educational achievement

as barriers to recruiting URM students.[39] URM and disadvantaged students also face bias,

financial burdens, social isolation, discrimination, and a lack of mentorship – all factors that can hinder success.[1,38,39] Additionally, the consistently high number of strong applications to PA programs likely decreases the incentive for programs to actively recruit diverse candidates.[36,39]

PA program tuition may be another obstacle. Like other health professions, the cost of PA education has risen substantially in recent years. As of 2016, not including living expenses, the average cost of attending PA school (tuition, fees, and incidental costs) was $93,660[33] compared to $54,523 in 2010,.[37] In 2011 the median educational debt was $80,000 and 23% of students owed > $100,000.[40] Of note, half of PA program respondents to a survey assessing perceived barriers to URM recruitment identified a lack of financial support as a barrier.[39] While the median cost of in-state public PA programs is significantly lower than at private institutions ($55,429 versus $93,547),[33] public institutions currently account for less than one third of PA schools, and the vast majority of new and developing programs are housed in private institutions.[41]

PA program faculty shortages and competing priorities

PA program growth combined with increasing clinical salaries have resulted in a protracted faculty shortage. As of July 2018, the PAEA faculty job website contained a list of more than 60 faculty vacancies in established and developing PA programs.[42] Currently there are 234 accredited PA programs; 64 are new, provisionally accredited programs, and 62 more programs have applied for provisional accreditation.[41,43] Faculty vacancies can create instability in established programs and challenge the ability of new and developing programs to obtain and maintain accreditation. These priorities have the

potential to eclipse concerns related to the issue of diversity, despite its urgency. Another

barrier to diverse student recruitment stems from a lack of minority faculty. Data from

2015 revealed that just 4.6% of PA program faculty were Hispanic or Latino, 4.7% were

African American, and 0.5% were American Indian or Alaskan Native.[44]

Addressing the problem

   The PA profession's major organizations have expressed a commitment to

promote diversity. In its 2017-2018 policy manual, the American Academy of Physician

Assistants (AAPA) formally advises that the multifaceted concept of diversity be

incorporated throughout the organization – in its leadership, constituent organizations,

commissions, workgroups, and publication and media activities.[45] Additional AAPA

efforts include a diverse network of constituent groups that promote diversity in the

profession, including the African Heritage Caucus; Lesbian, Bisexual, Gay and

Transgender PA Caucus; PAs for Latino Health; and a special interest group, PAs for

Health Equity, that promotes strategies to combat health disparities.[46]

   The most recent PAEA Strategic Plan includes advocating for diversity and

inclusion throughout PA education.[47] PAEA provides resources to help PA programs

increase diversity and seeks to collaborate with the Accreditation Review Commission on

Education for the Physician Assistant (ARC-PA) to develop accreditation standards that

encourage processes that promote inclusion and minimize bias.[47] In addition, the PAEA

Diversity and Inclusions Mission Advancement Commission has focused on recruiting

and retaining more minority students and faculty, increasing cultural competence

resources for programs, and strengthening collaborations with programs in the medical

community that aim to create a diverse pipeline of students to enter health professions education.[48] Past PAEA and AAPA conferences have included presentations on Project Access, a program created through an AAPA-PAEA partnership, that promotes the PA profession in communities of color.[49] The Project Access Toolkit provides resources for educating people about the profession and remains available on PAEA's website http://paeaonline.org/project-access-toolkit/.

These efforts notwithstanding, more needs to be done. The current Association of American Medical Colleges (AAMC) Chief Diversity Officer suggests that the only way to create meaningful change in diversity and inclusivity is for faculty to be introspective and engage in honest dialogue regarding issues of race, power, privilege, identity, and social justice.[50] Racial and ethnic conscious and unconscious bias and discrimination, cultural climate issues, standardized testing bias and structural barriers are often ignored and must be included in the discussion of diversity and inclusion.[50]

But what can PAs do? We need to encourage promising candidates from diverse backgrounds to enter our profession. PA program applicants often learn about the profession through interactions with practicing PAs, many of whom are their health care providers. In addition to providing information about the profession, PAs should encourage those from diverse backgrounds to engage with the profession by offering shadowing experiences. PAs can also approach local community organizations, high schools and colleges, particularly those with individuals from racially, ethnically, and socioeconomically diverse backgrounds, and inquire about ways to get involved to promote the profession. Additionally, PAs can recruit students of color by serving as

mentors that provide long term support for strengthening academic skills, acclimating to college culture, and building self-esteem.[51]

Practicing PAs can also get involved with local PA program admissions processes. Unconscious bias and the natural phenomenon of "similarity-attraction" can perpetuate a homogenous student body,[52] and research has shown a negative correlation between the number of white faculty on admissions committees and the number of accepted URM students.[39] Therefore, diverse composition of admissions committees is essential to ensure that admissions practices incorporate diversity of thought, perspectives, backgrounds, and experiences.

Clinical preceptors and rotation sites can also play a role by advocating for diversity. Agreements between sites and PA programs can indicate a preference for "a diversity of students to better serve the patient population served by this institution." Additionally, clinical sites can promote equitable care to diverse patient populations be requiring that students complete cultural competence training.[3]

PA educators should support the development of accreditation standards that require programs to promote diversity and inclusiveness. The 2004 IOM report, "In the Nation's Compelling Interest: Ensuring Diversity in the Health Care Workforce," recommended developing accreditation standards and criteria to encourage and support URM student and faculty participation. They include: assessing the success of diversity efforts, including URMs and other individuals with expertise in diversity on accreditation bodies and advisory groups, and applying sanctions if diversity-related standards are not met.[52] Accreditation bodies for health professions education programs should be more

assertive in formulating and implementing standards that encourage a critical mass of URMs by creating policies that explicitly express the value and importance of diversity among health professionals and by monitoring the progress of member institutions toward achieving diversity goals.[52]

Many PA programs promote primary care and serving the medically underserved in their mission statements. Admissions policies should be congruent and incorporate a holistic approach by assessing each applicant for attributes that best support the mission.[52,53] Research has shown a positive association between URM student enrollment and the use of holistic review in PA program admissions, whereby balanced consideration was given to non-academic attributes (e.g. resilience, overcoming adversity, desire to work with the underserved) and academic metrics (i.e. grades and standardized test scores).[54,55] In addition, data from 2016 suggests that the Graduate Record Examination (GRE) requirement, regardless of score, poses a barrier to URM student participation in PA school.[56] Thus, in order to attract a more diverse pool of students, PA programs with the GRE requirement may want to consider eliminating it.

During the educational process, a positive cultural climate is essential. To prepare students to serve diverse patient populations, PA programs must expose them to greater diversity in the classroom and to coursework focused on populations from diverse backgrounds. Diversity among students facilitates interactions with people who have different cultural backgrounds, which enhances the educational experience for all students[1] and may help mitigate the racial discrimination, prejudice, and feelings of isolation that some minority students report.[39,57] Ongoing faculty professional

development, self-assessment, and cultural diversity training is also needed. Rather than rely on traditional educational practices that perpetuate colorblindness and disregard students' racial and ethnic identities, programs will need to integrate cultural competence throughout the educational process in order to empower students to effectively address structural racism, social determinants of health, and health disparities.

Conclusion

Dr. Martin Luther King, Jr. described the "fierce urgency of now" in his efforts to bring people together in their efforts for change.[58] For the PA community, now is the time to transition from ideas and advocacy to action. Professional organizations need to use their political power and resources to mandate policy changes that result in higher proportions of URM PA students and PAs. The next generation of PAs must be prepared to care for an increasingly diverse patient population. Thus, the PA community must prioritize diversity and make intentional and sustainable efforts to recruit and retain students and faculty from underrepresented communities. In order to reduce health care disparities, individual PAs and the profession as a whole must do more to educate, advocate, and partner with local communities to achieve greater diversity in our workforce.

The profession is currently experiencing rapid growth.[43] Focusing on diversity now, by adopting multiple approaches, presents a significant opportunity to accelerate progress and enhance the profession's ability to respond to the needs of the patients it serves. In addition to the actions discussed above, the profession must collect data, identify specific goals, and allocate resources to address the lack of racial and ethnic

diversity in the PA workforce. Former AAMC Chief Diversity Officer, Marc Nivet, contends that an enormous gap exists between declarations of a commitment to diversity and any evidence of actual progress.[57] We know why diversity is important, but now we must ask: What is being done to address this issue? How do we measure success? And finally, what more can we do?

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CHAPTER 3

MANUSCRIPT 2

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Holistic Admissions and Underrepresented Minorities in PA Programs

Introduction

Background

More minority health professions students are needed to prepare the health workforce to serve underrepresented minority (URM) and other underserved populations.[1,2,3] Minority students contribute to enhanced cross-cultural interactions that prepare all students to effectively care for diverse patient populations.[2,4] As healthcare professionals, minorities are more likely than non-minorities to practice in underserved communities and, when caring for patients of the same racial or ethnic background, can improve communication and trust.[3,5] Additionally, minority healthcare professionals often serve as advocates for research and programs that benefit racial and ethnic minority populations.[6] Within the health professions, racial and ethnic minorities whose numbers do not sufficiently reflect their numbers in the general population are considered underrepresented. They include: Hispanics (all races), African Americans, American Indians or Alaskan Natives, and Native Hawaiians or other Pacific Islanders.[7]

As gatekeepers to the health professions, educational programs figure prominently in determining the composition of the healthcare workforce. Strategies health professions programs use to recruit, enroll, or retain more underrepresented minority (URM) students

include targeted scholarships, mentoring, holistic review in admissions, and academic support programs.[8.9] In their review of the literature published between 2010 and 2015, Snyder and colleagues concluded that evidence for the effectiveness of these strategies is lacking; however, they identified holistic review – a flexible, individualized method of assessing applicants' life experiences and personal attributes as well as academic metrics – as a promising approach.[8] The purpose of this study was to explore the use and impact of holistic review in PA program admissions.

Holistic Review

One of the main goals of holistic review is to promote diversity.[10] Core elements include: 1) broad-based selection criteria that are clearly linked to school mission and goals that promote diversity as a vital element for achieving excellence, 2) balanced consideration of applicants' experiences, attributes, and academic metrics, 3) individualized consideration of how each applicant may contribute to the learning environment and to the profession, and 4) consideration of race and ethnicity (where legal) when such consideration is narrowly tailored to achieve mission-related educational goals.[11]

The conceptual basis for the role of holistic review in increasing numbers of URM students stems from the weight of consideration given to experiences and attributes during the admissions selection process. Colleges, universities, and health professions programs have traditionally focused on academic measures, like grade point average (GPA) and scores on standardized tests (e.g., the Graduate Record Examination [GRE)]).[12,13,14] Due to multiple complex factors related to access to high quality K-12

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education, costs associated with preparing for standardized tests, and potential biases inherent in these tests, URMs in general do not perform as well as whites on these metrics.[14,15,16] In turn, URMs may not fare as well as non-minorities in typical admissions processes. Holistic review assigns relatively less weight to standard academic measures in selection decisions while placing value on attributes that may be more common among URMs (e.g., first in family to attend college).[17] Consequently, holistic review has the potential to increase URM admission.[17,18]

Although limited, existing research on holistic review in health professions programs supports the premise that holistic review can increase URM admission rates. Grabowski found that, when choosing applicants to interview for medical school, using holistic criteria that incorporated consideration of experiences and attributes (e.g., service orientation, having overcome adversity) resulted in selecting more URMs, first-generation college students, and self-identified disadvantaged students than using criteria focused solely on academic metrics.[19] Similarly, in their study of three cohorts of applicants to a University of New Mexico medical school, Bellejos, Rhyne, and Parkes found that increasing the weight of non-academic factors during the selection process increased the number of URMs accepted.[18] Single program pre/post evaluations in nursing and PA education found an association between adopting holistic review and greater URM enrollment.[20,21] Within dental education, 10 out of 13 schools that participated in an American Dental Education Association workshop on implementing holistic review subsequently enrolled higher percentages of URMs.[22]

Findings from a 2013 Urban Universities for Health national survey on holistic admissions involving 228 publicly-funded health professions programs – including medical, dental, pharmacy, and nursing schools – also support holistic review as a means to increase diversity. Schools using many elements of holistic review were more likely to report increased diversity among students than those using some or few elements.[17] Interestingly, among schools using holistic review, 90% reported incoming student GPAs that were unchanged or improved after transition to holistic review, and 96% reported unchanged or increased graduation rates. Although two thirds noted that holistic review required additional resources (e.g., additional staff to support admissions processes), a majority were using it, including 91% of the medical schools, 93% of dental schools, 78% of pharmacy schools, and 47% of Bachelor of Science in Nursing (BSN) programs.[17]

Despite studies showing a positive association between holistic review and diversity, extensive use of holistic review by health professions programs has failed to produce widespread increases in URM representation among students. For example, while 93% of dental school respondents to the Urban Universities for Health study reported using holistic review, between 2004 and 2017, the proportion of URMs enrolling in dental schools nationally did not substantially increase.[23] A potential explanation is that the benefits of holistic review may take more time to be fully realized. Alternatively, the available research on holistic review may not accurately reflect widespread outcomes. The majority of studies involve small numbers of programs that may have been particularly motivated to admit more URMs. The large Urban Universities for Health

study included numerous programs but was limited to public schools and based on a survey with a response rate of 64%.[17] Therefore, in addition to self-report bias, self-selection bias may have influenced results, such that schools with greater familiarity or interest in holistic review may have been more likely to respond. Evidence for an association between holistic review and diversity in PA programs is limited to one pre/post evaluation.

Diversity in the PA Profession

Greater URM representation in PA education is needed to optimally prepare students to meet the needs of diverse patient populations. PAs play a significant role in caring for underserved communities, which tend to be more diverse than the overall U.S. population.[24] PAs are more likely than physicians to see patients who are uninsured or have Medicaid and, over the last decade, have been increasingly relied on to provide care in safety net clinics like community health centers.[25,26] PA program efforts to enroll more URM students mirror those adopted by other educational programs.[9] However, like other health professions programs, PA schools in general have failed to significantly increase the proportion of URM students. Despite the increasing proportion of URMs in the labor force, as of 2017, only 7.4% of first-year physician assistant (PA) students were Hispanic, 3.3% were African American, and 0.5% were American Indian or Alaskan Native.[27] These numbers reflect an overall decline from 2002, when 6.9%, 6.1%, and 1.1% of PA school matriculants were Hispanic, African American, and American Indian or Alaskan Native respectively.[28] Considering the potential for holistic review to promote

URM student enrollment, research on the extent of its use and greater understanding of its utility in PA programs is warranted.

Study Aims

To examine how the use of holistic review in PA programs compares to its use in other health professions, this study was modeled on the Urban Universities for Health study of holistic admissions (described above). The primary aims of the current study were to assess the frequency of holistic review in PA program admissions and examine the relationship between using holistic review and proportion of URM matriculants. Additional aims were to identify holistic review elements used by PA programs, compare the metrics (e.g., GPA, patient care hours) of students entering programs that use and do not use holistic review, and describe the outcomes PA programs using holistic review experience.

Methods

Data Source

Data were obtained as part of the Physician Assistant Education Association (PAEA) Support to Advance Research (STAR) Program, an initiative that allows researchers to add 10 questions to the annual PA Program Survey of PA educational programs in the U.S.[29] Survey questions for this study were derived from the Urban Universities for Health study of holistic admissions. However, the survey instrument used by the Urban Universities for Health contained more than 10 questions and is not available in the public domain. Therefore, the specific content and focus of survey items for the current study were determined in consultation with the Association of American

Medical College's (AAMC's) Director of Advancing Holistic Review. The AAMC is a member of the Universities for Health partnership that produced the study of holistic admissions on which this study is modeled.

Responses to the holistic review survey items were assessed in conjunction with PA program information collected as part of the 2017 PA Program Survey (e.g., number of URMs in each program). A description of the 2017 PA Program Survey can be found at https://paeaonline.org/research/program-report/.

Measures

Holistic review measures

Overall assessment of holistic review use. Program respondents were given a definition of holistic review adapted from the AAMC definition[11] – which has been widely adopted across health professions[30,31] – and asked to select one of five response options to indicate whether their program policies and processes incorporate holistic review (see Appendix A for item text and response options). The definition used was, "A flexible individualized way of assessing an applicant's capabilities by which balanced consideration is given to experiences, attributes, and academic metrics and, when considered in combination, how the individual might contribute value as a PA student and PA." For the purposes of the main analyses, the two "no" response options were coded as 0 (not currently using holistic review), and the three "yes" response options were coded as 1 (currently using holistic review).

Specific elements of holistic review. Respondents indicated whether their admissions processes involved elements consistent with holistic review via five items,

each with a four-point response scale (1 = strongly disagree to 4 = strongly agree; see

Appendix A for item text). Elements assessed included 1) linking admissions decisions to

institution or program goals, 2) having formal statements that articulate the benefits of

diversity, 3) considering how an applicant would contribute to the learning environment,

4) considering how an applicant would contribute to the field after training, and 5)

considering the race and ethnicity composition of the entering class (where legal).

Respondents were also asked about the relative importance given to academic and non-

academic criteria during the initial admissions screening process using a single item with

5 response options ranging from 1 = academic metrics are the most important to 5 = non-

academic criteria are the most important (see Appendix A).

     Commitment to program diversity. For programs that reported using holistic

review, an index of commitment to improving program diversity through holistic review

practices was constructed based on the number of relevant holistic review elements

endorsed. Using holistic review and responding "strongly agree" or "agree" to each of the

first three elements listed above indicated the highest level of commitment (level = 4).

Using holistic review but responding "disagree" or "or strongly disagree" to all of these

elements indicated the lowest level of commitment (level = 1). An applicant's

contribution to the field after training is a consideration that extends beyond the program,

and consideration of race and ethnicity is not legal in all states. Therefore, these elements

of holistic review were not included in the measure of commitment to program diversity.

     Interview selection and non-academic screening criteria. Programs were asked

to identify how they select applicants for interview by selecting one of five options,

including "other." In addition, programs were asked to select all non-academic criteria considered during the initial admissions screening process (see Appendix A for response options).

   Holistic review outcomes. Programs that reported using holistic review were given a list of potential outcomes known to be associated with holistic review, for example enhanced learning environment or increased need for student support services, and asked to select all associated outcomes they have experienced.[17]

   PA program measures

   Proportion of URM students. The PA Program Survey collects aggregate program-level student body racial composition and ethnic composition measures separately. Accordingly, one measure of URM admissions was computed by race and another by ethnicity. For the measure based on race, the reported numbers of first-year African American, American Indian or Alaska Native, Native Hawaiian or Pacific Islander, and multiracial students in each program were totaled and divided by the total number of first-year students reported in all race categories to indicate percentage of first-year URM students by race. The categories "other" and "unknown" were not included as URMs. To indicate percentage of first-year African American students, the number of first-year African American students in each program was also divided by the total number of first-year students reported in all race categories. Ethnicity categories consisted of Hispanic, non-Hispanic, and unknown. For the measure based on ethnicity, the number of first-year Hispanic students in each program was divided by the total

number of first-year students reported in all ethnicity categories to indicate a percentage of Hispanic students.

Incoming student metrics. As part of the PA Program Survey, respondents reported mean number of hours of patient care experience and mean undergraduate science, non-science, and overall GPAs for incoming students. Programs that require the GRE for admission also reported mean GRE scores.

Tuition. The PA Program Survey gathers the standard program tuition rate for private programs and the in-state and out-of-state tuition rates for public programs. The lowest rate reported (i.e., standard rate for private programs, in-state rate for public programs) was used as a measure for program tuition.

Covariates

Students frequently choose to attend programs in close proximity to where they live.[32,33] Therefore, percentage of URMs by race in a program's U.S. Census division location (divisions 1 through 9)[34,35] was used as a covariate when evaluating the odds of URM (by race) student enrollment, based on whether or not a program uses holistic review. Percentage of African Americans and percentage of Hispanics in a program's U.S. Census division location were used as covariates when assessing the odds of African American and Hispanic student enrollment respectively. State locations of PA programs are not contained in the PA Program Survey dataset (as they may reveal identity), resulting in a measure of local racial and ethnic composition with relatively low geographic resolution. Due to the potential relationship between tuition and URM attendance at a given institution, consideration was given to using tuition as second

covariate. However, correlation analyses showed no relationship between tuition and first-year URM by race, African American, or Hispanic enrollment. Consequently, tuition was not adjusted for in the final analyses.

Analytic Plan

First, frequencies of PA program holistic review utilization (no or yes response), individual holistic review elements used, interview selection approaches used, non-academic screening criteria considered, and each holistic review outcome were computed. Then Mann-Whitney tests were used to compare the proportion of URM students (i.e., percent URM by race, percent African American, and percent Hispanic) in programs using holistic review to those not using holistic review, and independent samples t-tests were conducted to compare incoming student metrics. Spearman correlation coefficients were used to examine associations between individual aspects of holistic review and proportion of URM students. To examine the association between use of holistic review and percentage of URM students, controlling for population demographics in programs' U.S. Census divisions, binary logistic regression was used to estimate the odds of URM student matriculation depending on whether or not a program employed holistic review.

Results

The 2017 PA Program Survey attained a 100% response rate. A total of 221 of 223 programs responded to questions related to holistic review. The two programs that did not respond were provisionally accredited and had not enrolled an inaugural class. Three additional provisionally accredited programs that had not yet enrolled students

responded to questions related to holistic review but were unable to provide data on student race and ethnicity. Due to insufficient or unclear data, 22 of the remaining 218 programs were excluded from analyses involving race and ethnicity outcomes. Consequently, the final sample for analyses of race and ethnicity outcomes involved 196 (89.9%) of the 218 programs with matriculants.

A large majority of programs (169/218 [77.5%]), including most programs with provisional accreditation (46/57 [80.7%]), reported using holistic review. Compared to programs not using holistic review, a higher percentage of those using it reported use of elements consistent with holistic review practices (Figure 1). Program mean and median percentages of first-year students that were URM by race, African American, and Hispanic were higher in programs using compared to those not using holistic review; however, the difference in African American students was not statistically significant. The range of racial and ethnic URM students across programs was substantial; for example, the percentage of first-year students that were African American ranged from 0% to 31% (Figure 2). Programs not using holistic review were more likely to have no racial or no ethnic URM students. However, even among programs using holistic review, 16.6% had no URM students by race, 33.1% had no African American students, and 16.7% had no Hispanic students. On the other hand, several had percentages of racial and ethnic minority students that exceeded 20% (Figure 2). Matriculants in programs using holistic review had a slightly lower mean undergraduate science GPA than matriculants in programs not using it [3.49 vs. 3.57; t (189) = 2.48, p = .01]; other matriculant measures were similar across programs (Table 1).

Correlation coefficients showed modest positive associations between the use of holistic review and percentages of URM by race and Hispanic students, between specific holistic review practices and percentages of URMs by race, and to a more limited extent, between specific holistic review practices and percentages of African American students (Table 2). Logistic regression analyses revealed that, accounting for population demographics in a program's U.S. Census division, the odds of a URM student, by race or by Hispanic (vs. non-Hispanic) ethnicity, being a matriculant were higher in PA programs using holistic review compared to programs not using it (Table 3).

Relative frequencies of different pre-interview applicant selection approaches and non-academic criteria used in initial admissions screening are summarized in Tables 4 and 5, respectively. Figures 3 and 4 display the frequency of reported positive and negative outcomes (or challenges) associated with holistic review. Because experience with holistic review may be necessary to fully realize related benefits and challenges,[17,22] only responses from programs using holistic review five years or more ($n = 77$) are presented. Enhanced learning environment for all students was the only positive outcome reported by a majority of programs (51.9%) (Figure 3). The most frequently reported challenge – increased faculty and staff time dedicated to admissions – was reported by 44.2% of programs (Figure 4).

Discussion

Our analysis revealed that, similar to many other health professions programs, a majority of PA programs reported using holistic review. Use of holistic review in PA admissions was positively, though modestly and inconsistently, associated with URM

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student enrollment. For example, reported use of holistic review (no or yes response) modestly correlated with program percentage of Hispanic students, but using various individual elements of holistic review did not. Conversely, reported use of holistic review was not correlated with percentage of African American students, whereas having a greater number of holistic review elements that reflect commitment to program diversity was. Significant variation in holistic review outcomes and practices across programs may partially explain these results. Some programs using holistic review had relatively high percentages of URM students, but, on average, percentages were just slightly higher than those of programs that do not use holistic review. These findings suggest that in many programs, the impact of holistic review on racial and ethnic diversity among students is minimal or has yet to be realized. Notably, although holistic review has the potential to increase student diversity, the nature of its use depends on a program's intentions and actions, which may in turn be influenced by various factors, such as the degree of faculty "buy-in" or level of support from administration.[36,37] Thus, a program's goals and support for holistic review likely contribute significantly to its impact on URM admission.

Among programs not using holistic review, high percentages reported using elements consistent with holistic review practices; for example, 70% reported that the admissions committee considers how an applicant would contribute to the learning environment. Moreover, some individual and collective holistic review elements (i.e., commitment to program diversity) were modestly associated with percentages of racial or ethnic URM students. These results may stem from some confusion about what practices

constitute holistic review. They also suggest that specific elements of holistic review may have a greater impact on URM admission than others.

The only individual holistic review element that correlated, albeit weakly, with percentage of African American students was taking the racial and ethnic composition of a class into account when making selection decisions. Eight states have banned or partially banned race- or ethnicity-conscious admissions practices in public higher education,[38] and a minority of programs that use holistic review (40%) reported that they consider race and ethnicity. However, considering the nearly 46% decrease in the proportion of African American PA students in the last 15 years, criteria associated with even small increases in African American student enrollment may be important.

The 2003 Supreme Court decision, *Grutter v. Bollinger*, recognized the educational benefits of diversity as a "compelling interest" that could be pursued through the use of an individualized, holistic admissions process that incorporated race as one of many factors considered. Subsequent Court decisions have affirmed use of race-conscious practices but only when narrowly tailored to attain well-defined diversity goals that cannot otherwise be achieved.[38] Furthermore, recent events have spurred uncertainty. In 2018, the Trump administration rescinded Obama administration guidance supporting the use of race and ethnicity in college admissions as a means to increase diversity.[39] In addition, current legal challenges to consideration of race and ethnicity as a component of holistic admissions at Harvard University and the University of North Carolina at Chapel Hill are pending.[40] Thus, PA programs that that do not presently consider race and ethnicity as part of holistic review may now be even less inclined to do so.

An unexpected study finding was that program tuition did not correlate with enrollment of first-year racial or ethnic URM students. A 2018 study revealed that between 1999 and 2012, diversity among undergraduate students at public colleges and universities fell 4.5% for every $1000 increase in tuition.[41] Additionally, lack of financial support and debt have been identified as barriers to URM participation in health professions education.[9] However, while high costs may deter some URMs from applying to PA school altogether, our findings raise the possibility that for many, tuition has little influence on program selection. Data from the 2017 PAEA Student Report reveal that most PA school applicants consider tuition, financial aid and scholarships when choosing which programs to apply to; yet they do not rate these factors as very important or essential.[42] Our analysis was limited to a single academic year, and financial aid and scholarships that programs offer were not assessed. Therefore, to better understand any potential relationship between tuition and URM PA student recruitment, additional studies are warranted.

Most programs with experience using holistic review (i.e., using it five years or more) reported several associated benefits, but only one – enhanced learning environment for all students – was reported by more than half. A minority reported increased socioeconomic diversity (45%) and increased racial and ethnic diversity (40%) of students. While 14% reported lower attrition, 9% experienced higher attrition. These findings further support the conclusion that holistic review outcomes vary considerably across programs. The fact that no one challenge was identified by a majority suggests that implementation of holistic review practices also differs substantially. Still, 44% reported

increased faculty and staff time dedicated to admissions, and 27% reported an increased need for student support services. Thus, for many programs, holistic review appears to require substantial resources.

Strengths and Limitations

This study, involving a national dataset, is the first to explore the use of holistic review across multiple PA programs. A significant strength is that responses from all PA programs with continuing accreditation and all but two provisionally accredited programs during the 2016-2017 academic year were analyzed; therefore, respondents were highly representative of all PA educational programs. Study limitations include the restriction on number of questions related to holistic review, which limited the scope of our analysis. Moreover, survey research cannot capture nuances in holistic review practices, which are by definition individualized, that may be significant. Analyses were also limited by features of the data. Race and ethnicity are reported separately; therefore, it was not possible to determine a total percentage of all racial and ethnic URM students in each program. Data also represented one academic year; consequently, trends that may be more indicative of usual URM enrollment could not be identified. Finally, data were self-report, and the one control variable for local population demographics had low geographic resolution. Despite these limitations, this study provides insights into the extent and potential impact of holistic review utilization in PA programs.

Conclusions

A large majority of PA programs use holistic review; however, the overall URM student representation in PA education remains low.[27] The association between holistic

review practices and URM enrollment appears to be modest, and among programs using holistic review five years or more, a minority reported increased racial and ethnic diversity of students. Although additional experience with holistic review may yield greater student diversity in some programs, continuation of the status quo appears unlikely to substantially increase the overall proportion of URM PA students. The failure of holistic review to produce significant increases in URM students is not unique to PA and may stem partly from challenges associated with its use, like the lack of a conceptual framework to guide implementation and lack of needed resources.[43] Some health professions educational organizations, for example the Association of American Medical Colleges (AAMC), provide extensive holistic review guidance, including checklists and training workshops.[11,30] While these resources are undoubtedly helpful, for holistic review to promote increased URM participation in health professions programs more broadly, additional research is needed to better understand factors critical for success. An in-depth examination of holistic review processes in programs that achieve high URM enrollment, for instance, may provide valuable information.[43]

To date, various efforts aimed at diversifying the PA workforce have been insufficient, and no single intervention is likely to achieve substantial improvement. Considering the lack of progress, more work is needed not only to study and improve existing interventions like holistic review, but to develop new, more effective ones. In the meantime, programs committed to promoting diversity in admissions should examine their current practices and take advantage of existing resources to strengthen them.

Acknowledgments

Figure 1

Use of Elements of Holistic Review
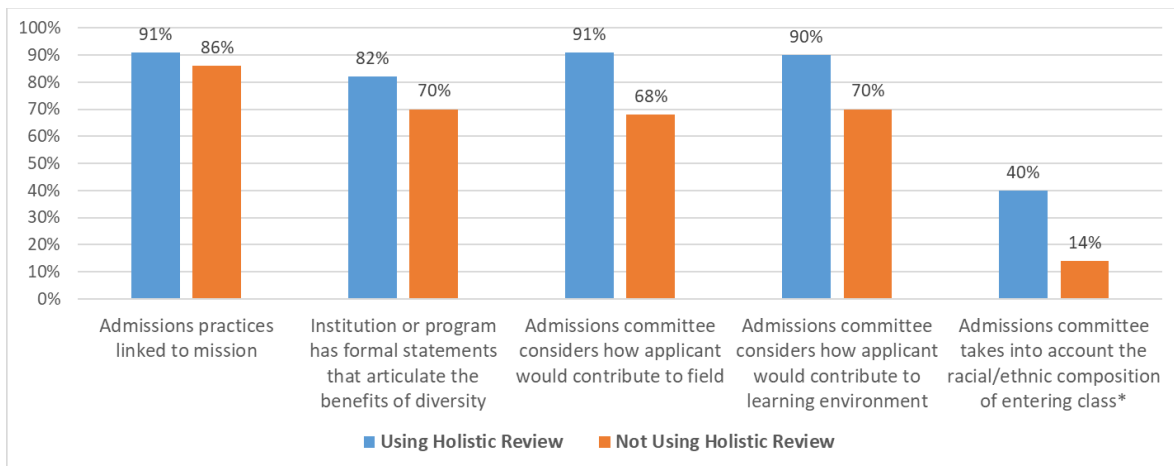
Programs Using Holistic Review, *n = 169*. Programs Not Using Holistic Review, *n = 50*.
*Consideration of race/ethnicity not legal in eight states. (Coleman 2014)

Figure 2

Percent of First-year URM Students: Distribution Across Programs Using and Not Using
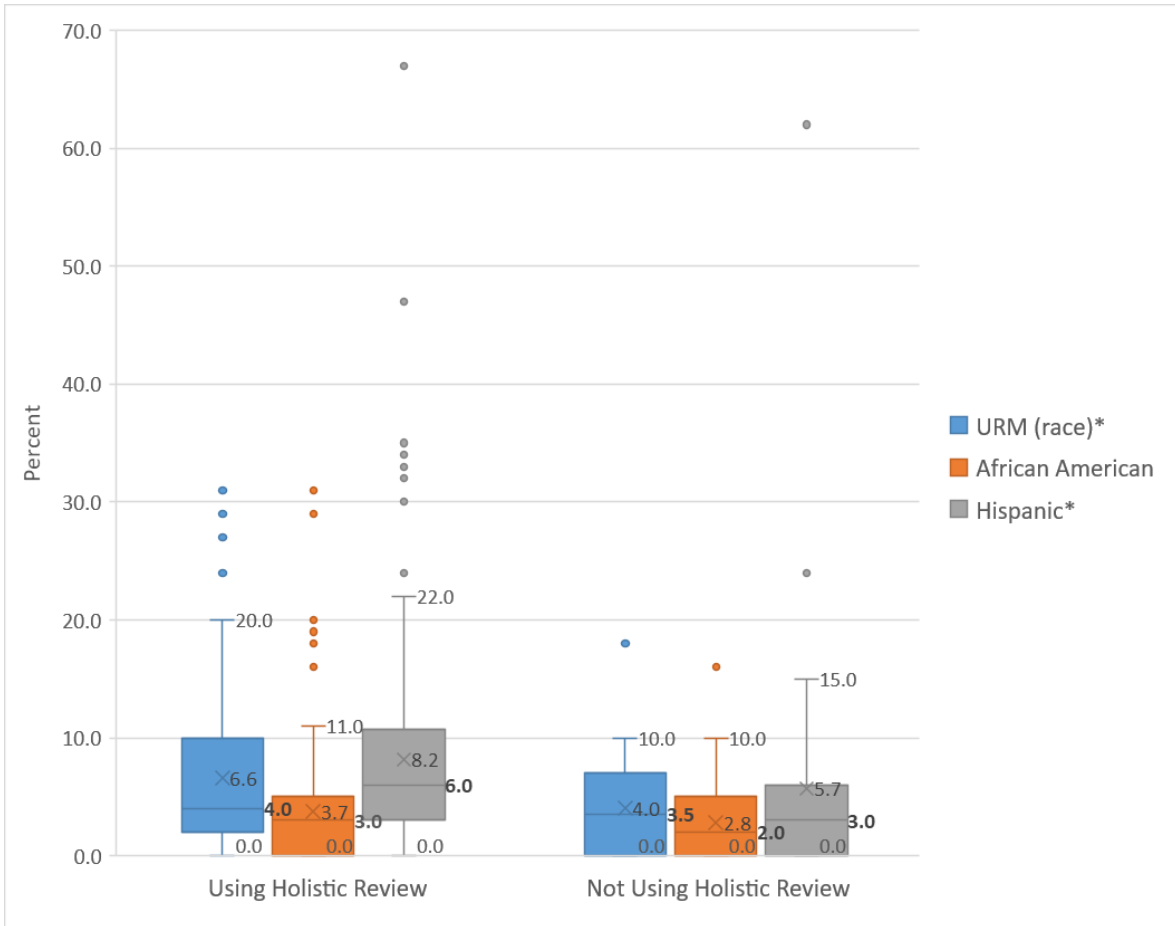
Holistic Review

X = Mean. Line within box = Median.
Programs Using Holistic Review: URM (race), *n=157*; African American, *n=157*; Hispanic, *n=156*.
Programs Not Using Holistic Review: URM (race), *n=39*; African American, *n=39*; Hispanic, *n=40*.
*Comparison is statistically significant: Median% URM (race), *U* = 2340.0, *p* = .02; Median% Hispanic, *U* = 2239.5, *p* = .01.

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Figure 3

Positive Outcomes Reported by Programs Using Holistic Review Five Years or More*

Increased racial/ethnic diversity among students — 31
Increased socioeconomic diversity among students — 35
Admission of students better prepared for success — 26
Admission of students who face barriers in life that may have excluded them in traditional admissions processes — 31
Increased awareness of diversity on admissions committee — 27
Enhanced learning environment for all students — 40
Lower attrition — 11

■ Number of programs out of 77 that reported the specified outcome

*A total of 77 programs reported using Holistic Review for Five Years or More

Figure 4

Negative Outcomes or Challenges Reported by Programs Using Holistic Review Five
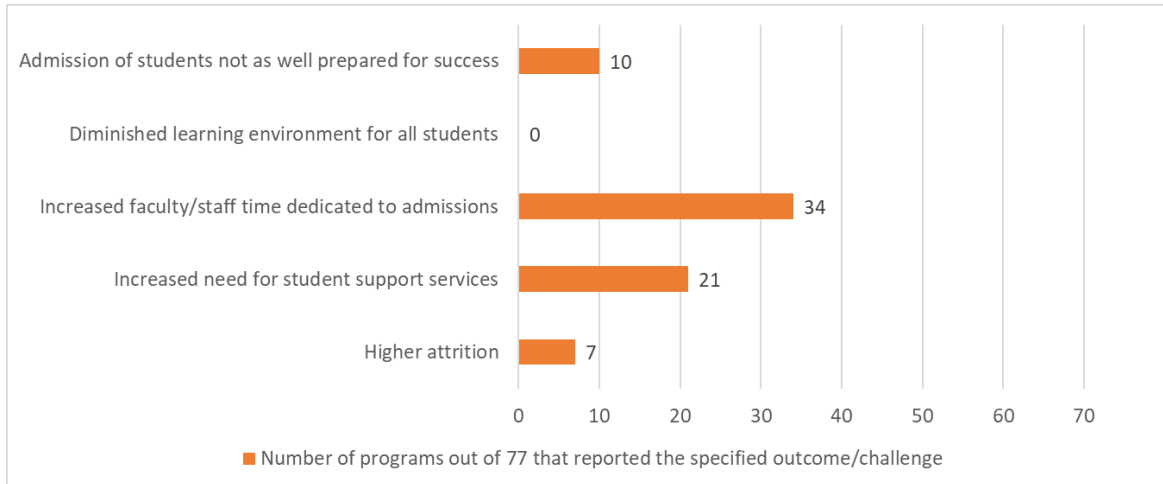
Years or More*

*A total of 77 programs reported using Holistic Review for Five Years or More

Table 1

Matriculant Measures: Programs Using Holistic Review versus Programs Not Using

Holistic Review

Measure	Using Holistic Review: Mean (SD)	n	Not Using Holistic Review: Mean (SD)	n	t	Sig
Undergrad GPA overall	3.55 (0.12)	161	3.58 (0.19)	43	1.48 (202)	.14
Undergrad GPA science	3.49 (0.15)	153	3.57 (0.19)	38	2.48 (189)	.01*
Undergrad GPA non-science	3.61 (0.12)	101	3.62 (0.20)	20	0.48 (119)	.63
GRE Verbal	153.42 (5.19)	101	152.30 (4.89)	25	-0.97 (124)	.33
GRE Quantitative	153.18 (4.91)	101	152.04 (4.78)	25	-1.05 (124)	.30
Patient care hours	3034.20 (2321.05)	113	2192.35 (2314.00)	23	-1.59 (134)	.12

*Only statistically significant difference is Undergrad GPA science

Table 2

Correlation of Explanatory Measures with Percent of First-year Underrepresented

Minority Students

	% URM (by race)	% African American	% Hispanic
Holistic Review			
Using holistic review	.16*	.08	.20**
Admissions linked to mission	.24**	.12	.08
Statements articulate diversity benefit	.19**	.09	.11
Applicant contribution to learning	.12	.01	.10
Applicant contribution to field	.11	-.03	.09
Class race/ethnicity composition	.16*	.17*	.08
Commitment to program diversity	.25**	.20*	.06
Importance of non-academic criteria	.03	.11	.15*
Additional factors			
Tuition	-.06	-.03	-.05
% URM (by race) in division	.15*		
% African American in division		.24**	
% Hispanic in division			.41**

Spearman's rho correlation coefficients shown. *$p < .05$, **$p < .01$.

Table 3

Odds of Being an Underrepresented Minority in a PA Program Using Holistic Review

	Outcome								
	% URM by race[a] (*n=196*)			% African American (*n=196*)			% Hispanic (*n=196*)		
Predictor	*OR*	95% CI	*p*	*OR*	95% CI	*p*	*OR*	95% CI	*p*
% Minority population[b]									
Using holistic review[c]	**1.56**	1.23,1.99	<.01	**1.33**	0.99,1.72	.06	**1.33**	1.09,1.62	.005

Note. Odd ratios (ORs) represent odds of being an underrepresented minority matriculant in programs using holistic review compared to programs not using holistic review. [a]URM classification based on race only. [b]Racial and/or ethnic minority grouping corresponds to that used for outcome measure. [c]Reference category is not using holistic review.

Table 4

Interview Selection: Programs Using Holistic Review versus Programs Not Using Holistic

Review

Interview Selection Process	Using Holistic Review (*n = 168*) Percent of programs	Not Using Holistic Review (*n = 50*) Percent of programs
Staff recommendation after file review	13.7	10.0
Faculty recommendation after file review	56.5	32.0
Automatic invitation based on meeting minimum academic requirements	3.6	12.0
Automatic invitation based on meeting minimum academic and other requirements	13.7	14.0
Other	12.5	32.0

Table 5

Non-academic Criteria Considered During Initial Admissions Screening: Programs Using

Holistic Review versus Programs Not Using Holistic Review

Criterion	Using Holistic Review (*n = 169*) Percent of programs	Not Using Holistic Review (*n = 50*) Percent of programs
First generation college status	32.0	6.0
Community of origin is medically underserved	40.8	8.0
Origin in geographic area specifically targeted by school	29.6	14.0
Foreign language ability	15.4	2.0
Socioeconomic status	31.4	0.0
Experience working with disadvantaged populations	43.2	10.0
Healthcare experience	78.1	76.0
Veteran status	50.3	36.0
Gender	11.2	0.0
Race or ethnicity	27.8	2.0
No non-academic criteria considered	14.2	22.0

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CHAPTER 4

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The Role of Organizational Culture in Holistic Admissions:

A Qualitative Multiple Case Study

Introduction

  Health professions educators have long recognized the need for more minority healthcare professionals to help improve the quality of care for minority and medically underserved patients and thereby reduce pervasive health disparities (Cohen et al. 2002; Mitchell and Lassiter 2006; Sullivan 2004). Minorities underrepresented in the U.S. health workforce relative to the general population include Hispanics/Latinos (all races), African Americans, American Indians or Alaskan Natives, and Native Hawaiians or other Pacific Islanders (Health Resources & Services Administration n.d.). African Americans and Hispanics/Latinos, for example, comprise just 7.6% and 7.4% of the physician workforce respectively, compared to 13.4%, and 18.4% of the general population (U.S. Census Bureau 2018; U.S. Department of Labor 2018). Over the last decade, health professions educational programs have widely adopted holistic review admissions practices as one means to increase diversity among students (Urban Universities for HEALTH 2014). While the existing literature suggests that holistic review is effective, much of the evidence for its association with increased underrepresented minority (URM) enrollment stems from evaluations involving a single institution or small numbers of programs (Felix et al. 2012; Grabowski 2018; Wells et al. 2011; Witzburg and

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Sondheimer 2013; Wros and Noone 2018; Zerwic et al. 2018). Findings from one large

2013 national survey of 228 publicly-funded health professions schools showed that a

high percentage of schools – including 93% of dental and 91% of medical schools – self-

identified as using holistic review and a majority using it reported an increase in diversity

among students (Urban Universities for HEALTH 2014). However, in the last 10 years,

URM representation among dental and medical students nationally has not substantially

changed (Acosta et al. 2017; Slapar et al. 2018). These data suggest that many

educational programs that use holistic review likely do not admit significant numbers of

URMs.

The apparent discrepancy between widespread use of holistic review and little if

any overall progress toward increasing proportions of URM students also exists in the

physician assistant (PA) profession. Created in the late 1960s mainly to address physician

shortages in rural communities, PAs, like nurse practitioners, have been increasingly

relied on to care for medically underserved patients, who are disproportionately racial

and ethnic minorities (Physician Assistant History Society 2017; Proser et al. 2015; Shin

et al. 2013). Therefore, a diverse PA workforce is needed to help achieve greater health

equity. Until the 1990s, PA programs educated higher proportions of URM students than

other health professions programs like medical schools (Mulitalo and Straker 2007). In

recent years, however, the proportion of URM PAs has remained stagnant. Despite the

increasingly diverse U.S. population, as of 2017, only 7.4% of first-year PA students

were Hispanic/Latino and just 3.3% were African American (Physician Assistant

Education Association 2018a).

This paper's first author completed a study of 2017 PA educational program data and found that 78% of PA programs reported using holistic review in admissions. The study survey, which was distributed by the Physician Assistant Education Association (PAEA), included responses from 99% of the 223 U.S. PA programs accredited at the time and showed a modest positive association between use of holistic review practices and percentage of URM first-year students. However, the association was largely driven by high percentages of URM students admitted to a relatively small number of the programs using holistic review. This finding, which served as a main impetus for the current study, raises the question: Why are some programs that use holistic review so much more successful at achieving diverse student enrollment than others?

Holistic review refers to a mission-driven selection process that incorporates balanced consideration of applicants' experiences, attributes, and academic metrics (Association of American Medical Colleges 2019). Model holistic review practices, which are based on four core principles shown in Box 1, include developing a mission statement for admissions that includes diversity as an essential goal and evaluating non-academic criteria related to a program's mission as part of the *initial* application screening process (Addams et al. 2010). Although tailored to the goals of an individual program, one of the main objectives of holistic review is to encourage diversity (Association of American Medical Colleges 2019). Guidance for adopting holistic review also emphasizes the need for a comprehensive approach to improving diversity that involves outreach and recruitment and evaluation of diversity-related outcomes (Addams et al. 2010; American Association of Colleges of Nursing 2016). It is important to note

that diversity encompasses the range of human differences, including attributes related to socioeconomic status, sex, sexual orientation, gender identity, religion, geography, disability, and age. As part of holistic review, diversity, mission-related factors (e.g., commitment to service in an underserved community), and personal characteristics – such as experiences with adversity or leadership qualities – are considered. However, due to the persistent lack of URM representation in the health workforce, discussions of holistic review often focus on increasing numbers of racial and ethnic minority students (Addams et al. 2010; Coleman et al. 2014).

A potential barrier to successful adoption of holistic review is the absence of an associated conceptual framework (Artinian et al. 2017; Glazer et al. 2016). Furthermore, health professions educators have called for more resources to assist them, including case studies involving successful practices (Artinian et al 2017; Glazer et al. 2016). Several articles describe program experiences with holistic review; however, a framework has not been tested. A failure to appreciate the influence of organizational culture is another factor that may limit the utility of holistic review. In their review of interventions to enhance diversity in medical schools, Vick and colleagues (2018, p. 57) note that, among the principles to improve diversity, culture is the one most often neglected. Moreover, the need for a supportive organizational culture, in other words a culture that values diversity and inclusion (or 'diversity culture'), is often mentioned in articles about holistic review (DeWitty 2018; Glazer et al. 2018; Wros and Noone 2018); yet, the influence of culture has not been specifically examined. The purpose of this study was to enhance understanding of effective holistic review by exploring the role organizational culture

plays in the holistic admissions process at two PA programs (or 'cases') with high URM

enrollment (relative to other programs using holistic review). A conceptual model

(described below) was used to help create a picture of what diversity culture looks like in

practice and generate insights useful to health professions programs seeking to

meaningfully improve diversity through admissions.

Conceptual Model

      The conceptual model was derived from the literature on holistic review and from

Schein's concept of organizational culture (see Figure 1). Schein (2017, p. 6) defines

culture as

> [...] the accumulated shared learning of a group as it solves problems of external
>
> adaptation and internal integration; which has worked well enough to be
>
> considered valid and, therefore, to be taught to new members as the correct way to
>
> perceive, think, feel, and behave in relation to those problems.

      Although various definitions of culture exist, nearly all include the notion that

shared beliefs and assumptions (e.g., underlying values) drive behavior (Schneider et al.

2012; Scott-Findlay and Estabrooks 2006; Tierney 2011). Schein's model of

organizational culture was adopted because it provides a practical framework for culture

examination. According to Schein (2017), culture exists in the context of three levels:

basic underlying assumptions, espoused beliefs, and artifacts. Shared basic assumptions

constitute the deepest, 'taken-for-granted,' level of culture that guides attitudes and

behavior. Insight into these basic assumptions can be derived from the next level of

culture – espoused beliefs – which include stated values and goals (e.g., a mission

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statement). Culture also manifests in artifacts – such as displayed photos and observable

ceremonies – which comprise the most superficial and visible level of culture. Schein

(2017) cautions, however, that while artifacts and espoused beliefs provide insight, an

appreciation for basic assumptions requires assessing whether attitudes and behavior are

consistent with the more superficial levels of culture. In other words, a discrepancy may

exist between espoused culture (e.g., what is stated) and enacted culture (e.g., what is

done). A germane example of the potential divergence between layers of culture is a

university that attests to the value of a diverse learning environment yet does not have a

diverse faculty or student body.

While creating a mission statement that promotes diversity is recommended as an

initial step for conducting holistic review, a mission statement may not accurately reflect

basic assumptions that support behavior. Therefore, the conceptual model for this study

depicts an organizational culture in its entirety (i.e., all three levels) that values diversity

and inclusion (i.e., diversity culture) as the primary mechanism for effective holistic

review (see Figure 1). Additionally, the model recognizes that culture influences the

determination of outcomes a university or educational program deems important enough

to measure (Tierney 2011; Zheng et al. 2010). Through its influence on attitudes, culture

also affects how people enact practices designed to achieve outcomes (Zheng et al. 2010).

In the case of holistic review, for example, culture may affect how low socioeconomic

status is perceived – as a weakness or a strength. The model also demonstrates the typical

relationship between organizational practices and outcomes, whereby practices are

reinforced or revised in response to performance on outcome measures. Based on this

case study's findings, a depiction of the effect diversity-related outcomes (e.g., increased numbers of URM students) can have on organizational culture, such as strengthening appreciation for diversity, was added to the preliminary model (shown in green). The model's underlying hypothesis is that, while mission-driven admissions practices are useful, in terms of improving student diversity, holistic review is most effective when it is culture-driven.

The proposed conceptual model served as a foundation for a novel approach to studying holistic review. As opposed to focusing on a transition to holistic review and associated outcomes, this study examined two PA programs that had already achieved diverse student enrollment. The goal was to enhance understanding of the potential influence of diversity culture on effective practices. The central research question was: How is an organizational culture that values diversity and inclusion (diversity culture) manifested in holistic review practices that achieve diverse student enrollment? Sub-questions were: 1) What specific admissions practices do programs that enroll high proportions of URM students use (e.g., for initial applicant screening)? and 2) How are these practices supported?

Methods

Design

A qualitative, multiple case study approach involving two instrumental cases was used to facilitate analysis and comparison of effective holistic review admissions practices (Crowe et al. 2011; Yin 2018). Instrumental cases are theory-dependent, seen in relation to other cases and examined in the "all-together" (Sandelowski 2011, p. 158).

Case study methodology focuses on intensive examination of data from multiple sources

to gain in-depth understanding of a phenomenon in natural settings and is therefore ideal

for studying complex concepts like organizational culture (Sandelowski 2011; Yin 2018).

Additionally, case study lends itself to pragmatism, which, as our guiding orientation,

allowed for flexibility in our approach to collecting data and conducting analyses that

would best address our research question (Creswell and Poth 2018). Due to the nature of

intensive inquiry, case study research often focuses on a single case (Miles et al. 2014;

Sandelowski 1996; Yin 2018); thus, statistical generalizability may be limited. However,

investigating large numbers of cases can impede thorough analysis and threaten the

integrity of the methodology (Creswell and Poth 2018; Sandelowski 1996). Therefore, we

analyzed two cases, which allowed for in-depth analysis and enabled cross-case

comparisons and replication of findings that enhance transferability (Miles et al. 2014).

Moreover, case definitions (described below) were constructed so that the conceptual

model linking diversity culture to holistic review practices that achieve high URM

enrollment could be tested. Thus, we were able to generalize findings to a theoretical

understanding of the issue under study and apply generalizations across cases, which

strengthens trustworthiness and further promotes transferability (Horsburgh 2003, p. 311;

Miles et al. 2014).

Sample and Setting

The main priority for case selection was to include 'best possible' cases, defined

as those that best exemplified the phenomenon of interest – diversity culture and holistic

review practices associated with high URM student enrollment. In other words, the

primary objective was to include cases according to the "*opportunity to learn*" about the phenomenon of interest from them (Stake 2008, p. 130). A secondary goal, aimed at increasing transferability, was that multiple cases vary with regard to factors that may serve as alternative explanations for high URM attendance (Creswell and Poth 2018).

Responses to questions contained in the 2017 survey of PA programs discussed in the introduction were used to identify programs (i.e., cases) that met criteria for best possible cases. Criteria derived from the main principles of holistic review were that programs must have: 1) indicated they use holistic review; 2) responded *strongly agree* or *agree* to three questions that assessed program commitment to diversity, including having a mission that supports diversity; and 3) reported that use of holistic review was associated with increased racial and ethnic diversity among students. Additionally, programs must have enrolled a proportion of URM first-year students that was at or above the 90th percentile for all programs using holistic review. Prior research has shown a moderate correlation between the regional population demographics of PA program locations and URM enrollment (e.g., PA program location in the West region of the United States is positively associated with Hispanic/Latino student enrollment) (Coplan et al. 2018). To account for this influence, when determining which programs met criteria for 90th percentile in terms of URM enrollment, a ratio of program first-year student demographics to regional population demographics was used (e.g., percentage of program students who were Hispanic / percentage of population in the New England regional division of the U.S. who were Hispanic). The ratio served as a measure of how representative students were of URM populations in program locations.

To strengthen transferability, once programs that met initial criteria were identified, the intent was to use maximum variation sampling by selecting programs in different geographic locations and by including one public and one private program (Creswell and Poth 2018). Seven programs – three public and four private – representing best possible cases were initially identified using data from the aforementioned survey of PA programs, which contained unique program identifiers only known to PAEA, the organization that distributed the survey. To maintain program anonymity, a PAEA staff member sent email invitations to the program directors of all seven programs on behalf of the researchers, who offered a $2000 honorarium for study participation. Four programs expressed initial interest. The two selected – both private, nonprofit programs located in the same regional division of the country – demonstrated the greatest willingness and ability to allow researcher access to their inner workings, which is essential for case study research (Sandelowski 2011; Yin 2018). Although ideal maximum variation was not achieved, the integrity of the selection criteria and methodology were maintained. It should also be noted that more than 60% of PA programs are housed in private, non-profit institutions (Physician Assistant Education Association 2018a). In addition, the study programs vary with regard to other characteristics that may influence URM enrollment, for example, minority representation among faculty (see Table 1).

Data Collection

Prior to data collection, we obtained Arizona State University Human Subjects Institutional Review Board approval for study procedures along with informed consent from all study participants. In order to gain a comprehensive picture of each program's

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admissions practices and culture, we collected data from a variety of sources: 1) texts and artifacts; 2) semi-structured interviews 3) formal and informal observations, and 4) a focus group of URM students at each program (see Table 2). Texts and artifacts included each program's university website and specific program webpages; brochures; displays (e.g., photos) at program offices and around classrooms; and admissions-related materials, including interview scoring sheets. We created a semi-structured interview protocol derived from the conceptual framework and, after pilot-testing with two PA program faculty members not involved in the study, revised it for clarity. We also created an observational worksheet to capture descriptive and reflective notes centered on organizational characteristics that may underlie processes for applicant selection. Although educational programs extend offers for admission, URM enrollment also depends on students' decisions to attend. Therefore, the semi-structured focus group protocol, which we pilot-tested with six, first-year URM students who attend the PA program where the first author (BC) is a faculty member, focused on students' reasons for selecting their program as well as their perceptions of the admissions process and program culture. After collection, we anonymized and transcribed all focus group and interview data.

As an experienced PA educator, BC is familiar with PA program admissions practices in general and with jargon and acronyms regularly used within the PA community. To complete the study's field research, she visited each program for four days during the 2018-2019 admissions cycle, when knowledge of the admissions process would be fresh in study participants' minds. At each program she was given a tour,

observed one faculty meeting where admissions-related topics were discussed, and

conducted the focus group of URM students. At both programs, seven first-year students

participated, which is an optimal number to promote focused discussion (Morgan 1997).

An overview of individual interviews and additional sources of data from each program

are listed in Table 2. During the program visits, BC remained onsite during 'off-times' to

familiarize participants with her presence and minimize their sense of intrusion.

Remaining onsite also provided opportunities for informal observations and impromptu

discussions.

Data Analysis

Directed content analysis, which is a strategy used to examine a phenomenon for

which existing theory may be underdeveloped, was used to evaluate the data (Hsieh &

Shannon, 2005). Although derived from the literature, the conceptual model for this study

had not previously been explored; therefore, directed content analysis aligned with study

aims (Hsieh and Shannon 2005). To facilitate directed content analysis, existing literature

or theory is used to create an initial list of codes, which are labels attached to portions of

text (or units of meanings) to designate themes (i.e., subjects that appear with regularity

in the data). These codes/themes are then used for initial data analysis (Hsieh and

Shannon 2005).

For this study, a codebook containing a preliminary list of start codes categorized

into five broader themes, or domains, derived from the conceptual model was developed

a priori (Colorafi and Evans 2016), and the approach to analysis of the first case was

repeated for the second case, which is a replication tactic used to assess for congruent

patterns (Miles et al. 2014; Yin 2018). During the initial phase of analyzing Case 1 interview data, study authors engaged in team coding and, in order to facilitate greater understanding of underlying processes, revised initial codes into gerunds, which are words ending in '-ing' that signify observable or conceptual action (Miles et al. 2014, p. 74). New codes were generated to reflect themes that were not captured within the start codes and, based on findings, two initial domains were divided into five narrower domains, and two new domains were created. After study authors worked together to create a revised coding scheme that authentically represented the data and their relationship to the conceptual model, BC iteratively recoded interview data and further refined the codes which, along with the aforementioned revisions, were incorporated into the codebook. The reliability of the final coding scheme was evaluated by assessing interrater domain agreement between BC and a colleague familiar with PA program admissions and qualitative data analysis (Kappa = 0.89 [95% CI, 0.82 to 0.97]).

Applicable codes generated from analysis of interview data were used to analyze student focus group data. Additional codes were also created to identify themes reflective of student reasons for choosing to attend their respective program; coded data were then interpreted using the same approach applied to interview data. Analysis of observational and artifact data was primarily conducted using analytic memos, which are narratives that record the researcher's reflections or thinking (Miles et al., 2014, p. 95). Analytic memos were also written to enhance interpretation of interview and focus group data and maintain transparency in relation to data interpretation. Data from the second case were analyzed using the same process used for the first case, with the exception that the

revised coding scheme was applied to assess for common themes and patterns (Miles et al. 2014; Yin 2018). Interrater domain agreement for the second case was also assessed (Kappa = 0.92 [95% CI, 0.86 to 0.99]). During a final phase of analysis, data from each case was organized into matrices to facilitate within-case and cross-case comparisons of similarities and differences that informed the development of propositions for further testing and allowed for additional evaluation of data relevance to the conceptual model (Crowe et al. 2011; Miles et al. 2014).

Within-case Analysis and Findings

Below we present a description and analysis of each program in the context of the conceptual model. We used pseudonyms to maintain participant anonymity. It was also necessary to withhold details that may reveal program identity.

Case 1 – Recent Holistic Review Adopter

Program 1 description. Program 1 was established in the 1990s at a private, nonprofit university that offers degrees in the health sciences and is located in an urban area with a diverse population. The university as well as the program's mission statement includes a commitment to diverse communities. A large majority of program faculty are non-Hispanic white, which is the norm among PA programs; however, minorities comprise a majority of university and program staff. In addition to a bachelor's degree, admissions requirements include standard prerequisite coursework in the sciences, a minimum cumulative grade point average (GPA) of 3.0, paid or volunteer healthcare experience, and PA shadowing. No standardized examination (e.g., Graduate Record Examination [GRE]) is required. The average overall GPA of admitted students is

slightly below the 2016-2017 national average of 3.57, and total tuition is higher than the national average of $87,160 for private programs. Additional program characteristics are listed in Table 1. Program 1 intentionally revised its admissions process in 2012 due to faculty dissatisfaction with class diversity (in 2010, the class had no African American or Hispanic/Latino students) and in response to a university-wide effort to increase URM enrollment.

Diversity culture. Although case selection criteria (which included responses to survey questions) aimed to identify PA programs with stated commitments to diversity, a more thorough evaluation was necessary to gain a true appreciation of culture (Schein and Schein 2017). Consistent with diversity culture, artifacts and espoused beliefs at Program 1 reflect a strong appreciation for diversity and inclusion, as well as a commitment to service. Webpages and brochures prominently display students, faculty, and patients from diverse backgrounds and consistently highlight service in diverse communities. These more superficial reflections of culture were in turn supported by student, staff, and faculty attitudes, behaviors, and actions. Data collected from the URM student focus group and from observations, for example, reveal that students experience a sense of inclusion and support within the program.

> <u>'Amaya,' Program 1 student focus group</u>: I always feel like I have an answer when people are like, 'Oh. How's school? How is everyone?' Especially when people were applying here, even in other programs, my mind just goes straight to how family oriented it is, how inclusive everyone is.

> <u>Program 1 interview day observation field notes</u>: A student described staff as

super supportive and faculty as super approachable. She remarked that the culture here is pretty amazing, that faculty are laid back but very dedicated. She advised interviewees that faculty are looking for people who are a culture fit here, and that the culture is all about supporting one another, empowering one another, and supporting the community.

When discussing factors that influenced their decisions to attend the program, students agreed that seeing "people who look like me" helped them determine that the program's publicized diversity was authentic.

'Bella,' Program 1 student focus group: […] on the website there's a lot of faces that look familiar to me, and so that was one of my main reasons. So yeah, location and they actually publicize the diversity. A lot of schools do that, but when you go and see it, it's like trickery. And when I came, I was like, Oh, […], there was more [people of color] and so that was like, I was like, Oh gosh, I really need to get in here.

Attitudes reflective of tolerance and appreciation for every individual's inherent value were consistent among faculty, who frequently mentioned applicants' and students' unique 'stories.' The program's director for 11 years, 'Nick,' has been with the program for 20 years. Observations and interview data help illuminate his beliefs and how they may contribute to program culture. For example, during a presentation he delivered at the start of the observed interview day, he praised faculty members – whose average tenure at the program (13 years) is more than twice the national average – and highlighted the program's many community service activities. He went on to welcome interviewees with

the statement, "We value you, your presence here, and your time." Student focus group participants recalled him expressing similar sentiments when they interviewed the prior year and spoke about how much they appreciate his desire to "[hear] us out as people."

> <u>'Francine,' Program 1 student focus group</u>: As students, I think one of the biggest things – I always repeat this to everyone – is the fact that [Nick] sat down with us our first day of physio and he was like, 'Okay. How are you guys feeling? What do you guys need from me to succeed?'

Nick's attitude is also reflected in his substantial efforts to improve diversity within the program, which faculty have welcomed. Actions he has taken include facilitating the program's more holistic admissions process, instructing faculty to utilize more URM guest lecturers, and recruiting URM faculty. In fact, during the study visit, the program had just hired its first African American faculty member.

In addition to leadership, a potentially important aspect of Program 1's culture is that the level of commitment to diversity appears to have been increasing in recent years, although not without some challenges. Students and faculty uniformly expressed a feeling of inclusion and support *within* the program; however, faculty and staff seem to be experiencing a slow but positive shift in *university* culture that one staff member described as "definitely diverse" and "moving towards inclusive." Interview data suggest that faculty and staff believe that university resources aimed at supporting the increasing numbers of minority students are not yet sufficient. Notably, the impact that the diverse student body is having on the culture as well as the curriculum was mentioned several times.

'Dee,' Program 1 staff interview: The student body is very social justice oriented as a whole. They're driving and forcing faculty to shift and change, right, and the school to shift and change. So it's more inclusive than when I got here 15 years ago, far more inclusive. I feel way better about being on campus as a person of color these days. I feel like we have great conversations, we have hard conversations, we have very uncomfortable conversations. And we create really safe spaces to make that all happen.

The circumstance described below was noted by three faculty and one staff member, all of whom viewed it as a positive occurrence.

'Katie,' Program 1 faculty interview: One thing that a student brought to our attention was more representation of people in color in our PowerPoints. This is just fresh […] a couple months ago and she actually brought it up to me in advising and she did speak to our diversity center here on campus about it. So that became a good faculty conversation and I wholeheartedly agreed with her. She's like, what does a blue-dot sign look like? It's a physical diagnosis kind of sign. What does a blue-dot sign look like on a black person? Or do you even see that? What does a melanoma look like on, every slide and every PowerPoint is Caucasian skin. And so I thought that was an excellent point.

Program practices

Admissions. When Program 1 revised its admission process in 2012, faculty weren't aware they were creating a 'holistic review' process. That said, the practices they now use reflect core principles of holistic review, with the exception that the process has

been aligned with defined program values as opposed to a specific mission. Consistent with model holistic review practices, non-academic metrics related to experience and background are considered as part of the initial screen of applications, and the overall process is intentionally designed to create a diverse pool of interviewees and accepted candidates that include URMs. Other factors identified that have contributed to success are that the program re-evaluated its values and has relied, in part, on a key informant or 'champion for diversity.'

As part of the initial approach to re-visioning the admissions process, Nick (the program director) recruited 'Umberto' – a Latino pediatrician who is a first-generation college graduate and founder of a successful network of pipeline programs. Umberto led what Nick described as, "… soul searching within the department about our admissions process to try to identify the part of our admissions process that favored a majority group …" Re-evaluating program values, particularly with regard to clinical experience, which is required for program admission, was an instrumental first step.

> Nick, Program 1 faculty interview: So what we started with was a sort of value proposition or a question of the faculty, 'What is it about clinical experience that you think that that says about the candidates? What attributes does that, in your mind, does that mean? Does that convey to them?'
>
> Nick, later in the conversation: So it was a process, it took months. [Umberto] led the first part of the process, where he sort of established our values and reviewed the way we scored experience.

As someone dedicated to service and actively involved in supporting youth from diverse backgrounds, Umberto is someone who can be viewed as a champion for diversity. He serves as a source of insight, vision, and connection to diverse communities. His discussion of revising the admissions process, supported by faculty interview data, illustrate his influence.

Umberto, Program 1 faculty interview: When we restructured those values that were more humanistic and more about interfacing with people and working with people, then that opened it up to a lot more different jobs and volunteer experiences. Patient educators, working at community-based organizations, mobilizing people, all of that. A lot of those experiences that a lot of kids of color come in with because that's their values. That made it less stringent upon clinical experience and academic standards. Although we still value them and we score it, it wasn't just about that.

'Uma,' Program 1 faculty interview: It used to be before [Umberto] came onboard, it was pretty much all just GPA and healthcare experience and that was pretty much it, and when we really looked at what's important to us, we can teach medical knowledge, we can teach some of these – like we can teach skills. What do we really want them to get out of healthcare experience? We're really looking for the exposure to the profession, and really it's about teamwork and communication.

During the process of reflecting on their admissions process, faculty came to consensus around criteria they value and agreed to changes to the admissions process.

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They revised the matrix used to evaluate applicants – which now includes scoring more types of experiences and placing greater weight on valued attributes – and incorporated consideration of most recent academic performance (i.e., last 60 credit hours). Additionally, a few years ago, the program added supplemental questions (to the centralized national PA program application) that ask applicants to describe how their background and experiences align with the program's core values and to explain any academic deficiencies. Perhaps more importantly, interview data suggest that faculty thoughtfully consider responses to these questions.

> Katie, Program 1 faculty interview: […] what I often notice a trend is, they'll use that question about any deficiencies in their application to just take a moment and explain and you learn a ton about the applicant. Like my mom was diagnosed with breast cancer my freshman year in college and I was her primary caregiver. You know, these stories that make me go, oh, no wonder you got a 2.9. And then it just gives them a chance to explain that deficiency, whatever it was.

Responding to a question about the importance of various admissions criteria, several faculty noted that they share program values such as tolerance and appreciation for diversity. Many also mentioned that faculty, who all participate in selecting candidates for admission, also contribute individual viewpoints to the decision-making process. The program has a standard process for evaluating applicants but faculty, who know each other well, realize and respect that people have different perspectives; for example, some faculty focus on healthcare experience or GPA more than others do. Other

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attributes repeatedly mentioned were appreciation for the PA role, resilience, and community-mindedness.

Feedback from current students, alumni, and adjunct faculty who participate in the program's unique interview experience are also considered when making selections decisions. The program's day-long interview involves groups of candidates rotating through multiple stations that include individual candidate interviews with a faculty or adjunct faculty member, a team decision-making activity evaluated by alumni, and, among other things, an informal discussion conducted by a panel of current students. Students also serve as greeters and guides throughout the day, which is structured to provide opportunities to evaluate candidates in different situations and generate feedback from multiple perspectives.

Outreach and recruitment. Program 1's university Office of Diversity and Inclusion (ODI) organizes numerous outreach and diversity-related activities throughout each year. University students are encouraged to attend and have the opportunity to participate in a program that provides financial support for those who regularly take part in community and on-campus events designed to engage youth from diverse communities. Within the PA program, each cohort has a 'service chair' to help facilitate community service activities, and several PA students serve as mentors to local high school students involved in the pipeline program founded by Umberto. Umberto described the mentorship relationships as "…one of the highlights of our program," about which applicants frequently inquire. Mentoring, he noted, "…is a lovely way where many of our minority students feel that they are giving back and bringing up the next

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generation." Program recruitment activities include regular informational sessions provided on campus and online. Additionally, the ODI specifically invites students who unsuccessfully applied to the PA program to an oncampus event involving current URM students that focuses on ways to strengthen their applications.

Academic support. Interview data reveal that Program 1 faculty are aware that students from diverse backgrounds may face unique challenges. For example, two faculty members discussed the difficulty students whose first language is not English can have finishing exams, because translating in one's head takes extra time. Moreover, the program reaches out to students after an initial exam failure and supports students formally and informally in several ways.

Katie, Program 1 faculty interview: So all those things [test-taking strategies, writing specialist, tutoring, counseling]. And then meeting with me, meeting with your advisor, meeting with whatever it takes to ensure academic success. I'll just kind of pull out all the stops because the earlier you catch them, the better.

Despite faculty commitment to these efforts, several discussed the need to provide more resources. Umberto's response to a question about how the program supports students reflects comments several faculty made.

Umberto, Program 1 faculty interview: One of the things that we were very cognizant of or at least realized, that if we were going to open up our program to students who perhaps weren't as well prepared academically or may potentially pose a challenge, that we as an organization had to make sure that we responded.

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In some ways, that's something we still need to work on. It has challenged us. The fact that we have diversified our cohort so much has helped us to define where the gaps are in our support system. It absolutely has helped us to define where our blind spots are and where our gaps are.

With respect to admissions, it is important to note that the ability to support students can affect selections decisions. Comments one faculty member made highlight the association.

<u>Ugo, Program 1 Faculty interview</u>: When we're agonizing over [an applicant] who doesn't quite have the grade point average in looking at their academic record and it's making us wonder, are they going to fail anatomy? Are they going to fail courses? […] What could we do if we take the stretch and admit them to make sure that they succeed? What are the resources?

Outcome measures. All PA as well as other health professions educational programs track numerous outcome measures, such as attrition, not only for self-evaluation but to meet accreditation standards (Accreditation Review Commission on Education for the Physician Assistant 2010). We aimed to gain insight into the specific relationship between outcome measures and admissions; therefore, rather than request an accounting of outcome measures, faculty and staff were asked to discuss how they determine whether an admissions cycle has been successful as well as how they respond when admissions outcomes are not achieved. In response, Program 1 faculty discussed typical approaches, including monitoring the academic performance (e.g., course grades, Physician Assistant National Certifying Exam [PANCE] pass rates) and professional

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behaviors of cohorts and looking back to determine if any admissions criteria correlate with poor academic performance, although none have been identified. In addition, several faculty discussed informally assessing the diversity composition of cohorts, not only with regard to racial and ethnic diversity but gender, age, and socioeconomic diversity as well. The influence of this assessment is perhaps best illustrated by program revisions to the admissions process to address poor URM student enrollment.

Case 2 – Mission-based Holistic Review

Program description. Established in the 1970s, Program 2 is among the oldest PA programs in the U.S. It is administratively housed in a private, nonprofit medical school but physically located on a separate campus that, like Program 1's campus, is in an urban area with a diverse population. Program 2's medical school and university do not include diversity in their mission statements; however, the program itself was created with an express mission to serve medically underserved communities and educate students from diverse backgrounds. Requirements for admission include standard prerequisite coursework in the sciences, a minimum cumulative GPA of 3.0, minimum science GPA of 2.75, and completion of the GRE or Medical College Admission Test® (MCAT), although the scores are not heavily weighted. In fact, the program is considering eliminating the standardized exam requirement. Paid clinical experience and PA shadowing are preferred but not required. The average overall GPA of admitted students is slightly below the national average and total tuition is higher than the national average for private programs. The program has engaged in mission-based holistic review of admissions applications for many years.

Diversity culture. Program 2's diversity culture is grounded in its mission. Program artifacts and espoused beliefs – including a program magazine; student-led website; and program celebrations, such as African American Day – uniformly reflect a commitment to diversity, inclusion, and service in medically underserved communities. Comments reflective of faculty, staff, and student attitudes, which provide insight into the deepest level of culture, consistently demonstrated an appreciation for the program's mission.

'Mike,' PA educator, Program 2 staff interview: The PA program, as far as I know, from its history back in [year Program started], has always had the mission to diversity because of where we are, who we are, how the program has evolved over the years, and the belief of the faculty and leadership.

'Karla,' faculty member for nearly 40 years, Program 2 faculty interview: You have to make a commitment to the mission of the program. And if you can't make a commitment then you have to leave. You can't be here and be unhappy, disgruntled. You can't try to disrupt or destroy the foundation of the program.

Student focus group participants reported feeling supported at the program. Additionally, their comments provide a sense of how the program's diverse faculty influence their attitudes.

'Alexis,' Program 2 student focus group: The diversity of the faculty really hit me because I went to [University] for undergrad and I've never had a diverse faculty

member my entire four years there. So when I came here, I was like, what, there's

a Latina PA, who's a family medicine, ER, a bunch of stuff. So I was just like,

what? What's going on? I was never used to that. That's why I never connected

with the professors over there, I don't know, because of that maybe. So I never

went up to them, I was like, I'm gonna do this on my own. That's how I've done it

all the time, so I'm just gonna continue doing it on my own. Through here I

actually feel comfortable going somewhere because they understand where we're

coming from.

Program 2's director, 'Lloyd,' joined the program as its director eight years ago

and has embraced its culture, partly by actively supporting diversity-related efforts.

Notable examples include backing development of a faculty member-initiated pipeline

program a year after he joined the program and recruiting an experienced PA educator,

Mike (who is quoted above), an African American known for his success supporting

URM students, to focus solely on recruiting and mentoring URM and socioeconomically

disadvantaged students interested in pursuing a PA career. When discussing the

program's new street medicine project, which he worked to establish, Lloyd relayed a

story to illustrate the impact of class diversity.

Lloyd, Program 2 faculty interview: Our development of the street medicine

program this year has tweaked our curriculum a little bit to start to prepare them

for caring for those who experience homelessness. And having a couple of

students in the room that experienced homelessness was a real shocker for the

class and really humanized the issues that occurred to our neighbors who are out

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on the streets because they suddenly realized that their respective colleagues had that life experience. So we see that across all the different cultures.

With regard to Program 2's university and medical school, faculty and staff reported that the medical school in particular promotes diversity, and they expressed satisfaction with the support the program receives for diversity-related pursuits.

Program practices

Admissions. Program 2 periodically makes changes to its admissions process but in general has used a process similar to its current one for many years – long before the concept of holistic review gained recognition. Similar to admissions practices at Program 1, Program 2's practices are consistent with holistic review core principles. Mission-related factors, for example, comprise a substantial portion of the initial application screening matrix and are incorporated into the interview scoring sheet. Additionally, interviews are 'blinded' in that interviewers do not have access to candidates' applications when evaluating them. Candidates are interviewed individually by a pair of program representatives, comprised of faculty and adjunct faculty or of a current student and a faculty or adjunct faculty member. Current students and a group of alumni also conduct panels to answer candidate questions.

The program's admissions selection committee, which includes a subset of the faculty, is diverse, and similar to Program 1, Program 2 has a supplemental application that includes a question about how the applicant will fulfill the program's mission and one that asks applicants to explain any instances of poor academic performance.

With respect to the program's mission, faculty, staff, and student interview data reinforce that it is central to selections decisions. One of the two admissions committee co-chairs, 'Ben,' a Latino who stated that his commitment to the program's mission is part of the reason the program director asked him to co-chair the committee, discussed the approach he began using when he became co-chair.

Ben, Program 2 faculty interview: So then what I do as chair, when I chair, is I'll put the mission up on the screen. I'll say, 'You guys, before we start. I want to start doing…' this was a couple of years ago. 'Let's read the mission. Let's just remember why we're here. Let's remember the type of student we want here.' Right? That's all I would say. Then we'd start the reviewing process.

When asked about applicant attributes that are considered most important, many faculty and staff identified 'mission' first, and all mentioned mission fit as a significant consideration. Similar to Program 1 faculty, they also mentioned the different perspectives that admissions selections committee members contribute. Observation of the Program 2 faculty meeting revealed that faculty carefully attend to evaluating all applicants fairly; however, considering different views appears to contribute a sense of equity. Ben, for example, stated that his focus on an applicant's mission fit is balanced by others who focus on "how strong of a student they were."

Outreach and recruitment. Program 2 faculty and students engage in numerous outreach activities focused on serving and engaging youth from diverse communities. Moreover, Lloyd (the program director) reported that promoting the program's mission and diversity contribute to its success with URM enrollment.

Lloyd, Program 2 faculty interview: So, to me it's been really a mindfulness of trying to send a message to students of color, students from underrepresented minority backgrounds or disadvantaged communities that this is a welcome place and that also starts with hiring faculty and staff of underrepresented minority backgrounds and making sure that we have a reflective group of who we are as a culture.

Lloyd's view is supported by student focus group participants, who reported that they were attracted to the program's mission to serve underserved communities as well as its diversity.

'Blake,' Program 2 student focus group: Because I saw the mission statement that it was for underserved communities, African Americans as well as Latino so I want to make sure that I wanted to apply to this program and programs that had a similar mission that are within my community.

'Gene,' Program 2 student focus group: I met [program director]. I got to speak to them and I knew what their mission statement was and I knew they were true to their mission statement. And I saw their awards for diversity and I knew that they didn't only talk the talk but walk the walk. So I really liked that.

The outreach and recruitment activities that faculty and staff most frequently mentioned were the program's pipeline program and Mike's recruiting and mentoring efforts. 'Nora,' a Latina who, as a pre-PA student participated in a health careers opportunity program (HCOP) pipeline program, is the faculty member who spearheaded the program's pipeline efforts shortly after she joined the program approximately seven

years ago. She is also currently preparing to assume Lloyd's co-chair position on the admissions committee. Pipeline program activities, which include monthly sessions delivered to 60 youth from underserved areas, are designed to expose youth to various health professions and provide resources for support. Nora stated that the pipeline program works because sessions are led by PA program student volunteers, and a student volunteer stated that PA students keep coming back because the youth who participate are so inspiring. Mike's work focuses on supporting undergraduate students specifically interested in the PA profession. Similar to Ben and Nora, Mike – whose dedication is demonstrated by the substantial success he has had helping students matriculate into Program 2 and other PA programs around the country – is someone we identified as one of several champions for diversity in Program 2.

Academic support. Program 2 has formal and informal approaches to identifying and supporting struggling students. The formal process is based on assessing exam performance across courses.

> Lloyd, Program 2 faculty interview: One failure in a course, one failure in a test and they're in front of the course directors to kind of check in. A second failure and they have a learning contract that kind of stipulates all the different resources that we encourage them to consider accessing. A third failure and they're in front of the student progress committee, which does the same thing but looks at a broader depth and kind of kicks the bar up a little bit in terms of the level of support.

In addition, course instructors work with students individually, and one faculty member has been designated to, among other responsibilities, provide learning support services. These efforts notwithstanding, a few faculty discussed ongoing efforts to provide more support. For example, one described the program's efforts as a continual "work in progress." The faculty member providing learning support services, who assumed the responsibility about a year ago, noted that students who have never relied on others are often reluctant to ask for help. As part of her relatively new role, she hopes to establish a way to help students better prepare for the program's challenging curriculum prior to the start of classes.

Outcome measures. In addition to reporting that the program formally monitors academic performance and student professionalism and informally assesses the diversity of the student body, Program 2 faculty reported that they track what percentage of their students go on to practice in primary care and medically underserved areas. Although not directly related to admissions, the program also surveys and interviews students as they exit the program to determine if certain program goals were achieved, including whether students developed a greater appreciation for diverse communities. At the time of the program visit, faculty had just assessed whether any admissions criteria were associated with attrition but found none. Regarding outcome measure impact on admissions, Lloyd noted that, in order to promote diverse student enrollment, approximately five years ago, the program adjusted its initial application screening rubric to weight mission-related factors more heavily.

Cross-case Analysis and Discussion

In this section, we first discuss case differences, then examine commonalities and their relationship to the conceptual model and research questions. Next, we discuss factors other than program culture and practices that may influence URM enrollment. Then we address study limitations and strengths and conclude with a section discussing study implications, including propositions for further consideration.

Differences

While several of the programs' characteristics differ, the two that ostensibly have the greatest potential to influence URM student attendance are prerequisite requirements and faculty diversity (Alger and Carrasco 1997; Coplan et al. 2018; Yuen and Honda 2019). Traditionally, admission to PA school requires hands-on clinical experience and, over the years, 60% of programs have added completion of the GRE as a requirement; < 1% of programs require the MCAT, and 1.4% accept the GRE or MCAT (Physician Assistant Education Association 2018a). Program 1, however, does not require a standardized exam, and Program 2 does not require clinical experience (although it is preferred). Questions regarding the ability of the GRE to predict graduate school success are well known and, while limited, research suggests that the GRE is a poor predictor of PANCE (PA certification exam) performance (Butina et al. 2017; Higgins et al. 2010). Additionally, a recent study of 2016 PA program applicant data suggests that the GRE requirement, irrespective of score, may be an obstacle for URM applicants (Yuen and Honda 2019).

Some have also questioned the ability of clinical experience to predict performance in PA school, and the only study addressing the issue found no relationship between hours of clinical experience prior to PA school and clinical outcomes assessed during PA school (Hegmann and Iverson 2016). Whether clinical experience is a barrier for URM students has not been studied; however, Program 1 faculty determined that the types of clinical experience the program considered prior to revising its admissions practices were likely to disadvantage URMs. Interestingly, Program 1's director also mentioned that during the admissions revision process, he advocated for eliminating clinical experience as an absolute requirement but was "overruled" by the faculty. Program 2's director, on the other hand, noted that the program is considering eliminating the standardized exam requirement. Program director views suggest that they are cognizant of factors that may disadvantage URM applicants; however, both programs have achieved diverse student enrollment, which suggests that other influences may be more important.

Program 2's more diverse faculty appears to attract URM students and undoubtedly has a positive influence on the learning environment (Bowman 2016; Umbach 2006). Although Program 1's faculty are more reflective of the overall PA population, which is approximately 80% non-Hispanic white (National Commission on Certification of Physician Assistants 2019), the staff and study body are diverse, which appears to impact program culture and students' perceptions of it. In addition, Program 1 recently recruited its first African American faculty member and is recruiting more URM

guest lecturers. Thus, both programs seem to appreciate the value of diverse representation among instructors.

An obvious difference between the cases is that Program 1 transitioned to a more holistic admissions process in more recent years whereas Program 2 has used a holistic process for as long as faculty can remember. This difference helps illuminate the fact that valuing diversity seems to be necessary but insufficient for effective holistic review. When Program 1 faculty reflected on their values in 2012, they recognized that they value diversity and inclusion; yet, their admissions practices did not yield diverse student enrollment. It was not until after they deliberately aligned admissions practices with their values that they began enrolling diverse classes of students. Thus, even though diversity and inclusion were valued, a purposeful approach to developing admissions practices was necessary.

Program 1's more recent transition to holistic review also illustrates the potential impact that achieving diverse student enrollment may have on the curriculum and culture. While faculty and staff at both programs discussed the benefits of having students with diverse backgrounds, Program 1's experience highlights the impact of URM student perspectives. For example, an appreciation for how students are effecting change can be gleaned from the story several Program 1 faculty and staff told about the URM student pointing out that she needed to see people of color represented in course material.

Commonalities

Diversity culture. Case examination revealed that in both programs diversity is not only valued, expressions of diversity are abundant, and substantial resources are

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devoted to cultivating it. In other words, both programs appear to have authentic diversity culture. Additionally, notions of diversity at both programs are intertwined with a commitment to improving health care in underserved communities, which is the primary rationale for increasing the numbers of URM healthcare professionals (Coleman et al. 2014; Mitchell and Lassiter 2006).

Program practices

Central research question: How is diversity culture manifested in holistic review practices that achieve diverse student enrollment? According to the depiction of holistic review in the conceptual model, culture (i.e., underlying assumptions as well as a mission statement) drives admissions practices that effectively achieve diverse student enrollment. Interestingly, neither case study program relied on established guidance when creating its holistic admissions process. Instead, as alluded to above, firmly held beliefs about the importance of serving underserved communities informed the goal to develop admissions practices that would encourage URM attendance. Thus, culture appears to have been a compelling motivator to create program practices aligned with defined program values (or mission) – which is a core tenet of holistic review. Another important similarity between the programs is that their leaders seem to have translated genuine beliefs about the value of diversity into actions that facilitate diversity-related goals. With respect to admissions, leader values and insights are clearly reflected in their decisions to ask individuals who we have identified as champions for diversity to play leadership roles in the admissions process.

The influence of 'champions' may provide the greatest insight into how diversity culture manifests in admissions practices. In their eloquent study of Multiple Mini-Interview (MMI), interviewers' 'taste' – defined as "…individuals' subjective judgments as a matter of practical sense" – Christensen and colleagues (2018, p. 292) describe the influence of *alters* (e.g., role models or leaders) on *actors* who, in the context of admissions, are applicant raters. They note that according to socialist Crossley (2013), "*Alters* teach *actors* how to appreciate and enjoy cultural objects that they might not otherwise 'get'" (in Christensen et al. 2018, p. 291). Consequently, actors develop shared appreciation for alters' tastes. (Christensen et al. 2018). In relation to evaluating applicants to medical school, Christensen et al. found that raters seemed to share preferences for particular applicant attributes and conclude that these preferences may partially result from "… shared habituated norms that occurred in the course of medical school (if not earlier)" (Christensen et al. 2018, p. 301). They also note that *enculturation* appears to profoundly influence rater preferences for candidates who have attributes and characteristics with which they can identify.

Through their examination of rater preferences, Christensen et al. (2018) illuminated the influence that social interactions, habituated norms, and values may have on subjective rater judgments. Thus, it could be said that they illustrated the influence of culture. Although we did not focus on how raters (i.e., faculty) form their impressions, it's clear that their judgments about applicant suitability for their respective programs are influenced by program culture. At both programs, different faculty perspectives are welcomed and respected. However, having individuals (i.e., champions) who have deep

insight into diverse communities participate in and help lead (or perhaps act as *alters* in) the admissions process facilitates a connection to those communities and appears to impart a stronger appreciation for applicant attributes associated with diversity-related program goals. Interestingly, the appreciation that faculty seem to have for different points of view raises questions about the best way to achieve equity in admissions. For example, how do educational programs reconcile simultaneous recommendations to strive for interrater reliability and include diverse perspectives on admissions committees (Addams et al. 2010)?

Champions at each program may have contributed to the insight that faculty appear to have into the life experiences and potential challenges students from diverse backgrounds may face. Perhaps as a result, both programs include a question in their application that allows for explanation of academic deficiencies. Taken together, the programs' admissions practices similarly reflect diversity culture, which appears to manifest not only in practices designed to increase access for URM applicants but in the consideration applicants are given. Consideration of each applicant is informed by a genuine appreciation for vastly different life experiences and the belief that individuals who embody these differences positively impact the learning environment as well the health care received by people in diverse communities.

Research sub-question 1: What specific admissions practices do programs that enroll high proportions of URM students use? Both programs' admissions practices are aligned with program values (or mission), which is central to holistic review. Additionally, both evaluate factors related to program goals as part of their initial

application screens. These findings add evidence to support model holistic review practices (Addams et al. 2010; American Association of Colleges of Nursing 2016). As previously discussed, both programs also include a question in their application that allows applicants to address any instances of poor academic performance. Another similarity is that at both programs, current students are heavily involved in applicant interview experiences. Whether or not they influence URM attendance is unknown; however, based on URM student focus group data, current students of color in particular may help URM applicants feel comfortable and provide an indication that publicized commitments to diversity are authentic.

Research sub question 2: How are these practices supported? At both programs, outreach activities and engagement with a pipeline program contribute to working across a continuum of efforts aimed at supporting diverse student enrollment (Addams et al. 2010; Coleman et al. 2014; Glazer et al. 2018). Additionally, case study data suggest that current students find participation in pipeline program endeavors rewarding and that their involvement may help foster mentorship relationships. The programs also share a similar approach to academic support in that they reach out to students as soon as an indication of academic difficulty is identified and recognize the importance of providing a variety resources in order to help meet the different needs students have. Faculty comments about the need to do more were also similar across programs, suggesting that supporting diverse classes of students requires sustained commitment.

Outcomes measures. When discussing admissions-related outcome measures, faculty at each program reported that they informally assess overall class diversity.

Moreover, both programs had revised admissions practices, to differing degrees, as a way to achieve greater diversity. It may be important to note that, based on interview data, neither program has been able to identify any admissions criteria that consistently correlate with poor academic performance or attrition. Although it's uncertain how they would react to such correlates, faculty interview data suggest that they rarely question the capability of students who struggle academically and instead focus on improving their respective program's ability to support them.

Potential Alternative Explanations for High URM Enrollment

In a prior study, Hispanic/Latino and American Indian students described the pain of leaving home and feeling isolated from one's family and culture when attending nursing school (Evans 2004). Underrepresented minority students at both PA programs expressed a similar notion, as several reported that location close to home or in a diverse community was a significant consideration when determining where to apply and what PA program to attend. Although neither program was able to provide an accurate account of the percentage of their applicants that were URMs, both almost certainly receive more applications from URMs than programs located in areas with less diverse populations. The case selection criteria attempted to account for the influence of location; however, the impact may be significant. Yet in 2010, Program 1, situated in an area with a diverse population, did not enroll any African American or Hispanic/Latino students. In addition, Program 2 goes to great lengths to promote the program and recruit URM students in order to maintain class diversity. Therefore, while location may influence each program's

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ability to attract and consequently enroll URM students, admissions and other program practices appear to have a stronger impact.

Another plausible explanation for high URM enrollment, not borne out by this study, is low tuition or the availability of scholarships. Tuition rates at both programs are higher than the average tuition for private programs, which is significantly higher than the average in-state tuition of $47,886 for public programs. Both programs have received Health Resources & Services Administration grants to provide scholarships for disadvantaged students, and Program 1 offers a need-based scholarship of $10,000 per year to two URM students in each cohort. However, scholarship award decisions are made after matriculation, and scholarship offerings do not reduce costs to an amount comparable to in-state tuition at public programs. When asked about factors that influenced their decisions to attend their respective PA program, student focus group participants across programs identified tuition as a "con" but noted that cost was not a deciding factor. This perspective is consistent with responses to a 2017 national PAEA survey of students showing that tuition and scholarships were not among the factors students considered *very important* or *essential* when selecting a PA program (Physician Assistant Education Association 2018b).

A final plausible explanation for high URM enrollment in the case study programs is that URM applicants' desire to be close to home and serve their communities seemed to counterbalance their recognition of costs. The downside of high program costs was also mitigated by the potential for increased personal income and security.

Limitations and Strengths

Selecting programs in the same region of the country and limiting our examination to two cases were necessary to preserve the integrity of the study methodology. However, in-depth understanding derived from examination of phenomena in natural settings (Sandelowski 2011; Yin 2018), theoretically driven sampling, and research questions driven by the conceptual model, "…not by a concern for 'representativeness'" (Miles, et al. 2014, p. 33) buttress the study. For this analysis, the main concern was "… with the *conditions* under which the theory operates, not with the generalization of the findings to other settings" (p. 33). Through directed content analysis, we were able to identify significant commonalities relevant to the initial conceptual model across two programs, despite different approaches to holistic review and duration of use. In addition, we identified the potential impact diverse classes of students can have on curriculum and culture. These activities allowed us to validate and extend our conceptual model in readiness for theoretical transfer to other 'cases' of programs using holistic review. We also promoted transferability of findings by providing context-rich descriptions and offering propositions for further testing (which are described below) (Miles et al. 2014).

A limitation of qualitative work is the potential for findings to be interpreted as more patterned than they actually are (Miles et al. 2014). To address this limitation, we sought negative evidence from study participants, who demonstrated a willingness to discuss various frustrations and challenges, and investigated potential alternative explanations for high URM enrollment. In addition, several measures were undertaken to

promote trustworthiness and authenticity (validity and reliability in quantitative terms).

We strengthened confirmability by providing a detailed description of study procedures,

analyzing data from multiple sources, and maintaining awareness of personal

assumptions through the use of analytic memos. Finally, dependability and credibility

were enhanced by using conceptually-driven analytic procedures replicated across cases,

confirming findings with study participants, and triangulating across data sources (Miles

et al. 2014).

Implications and Conclusions

Studies show that the benefits of interracial and other intergroup interactions

among students include gains in psychological well-being, cognitive skills, intellectual

and civic engagement, and intercultural effectiveness, as well as reduced prejudice and

more favorable intergroup attitudes (Bowman 2013). Thus, in addition to demonstrating

the positive effect that a diverse student body has on the educational environment, prior

research alludes to the impact it may have on culture. We did not specifically assess the

benefits of diversity; however, study findings shed further light on how students from

diverse backgrounds may influence organizational culture. Consequently, the original

conceptual model was revised to show that holistic review outcomes, specifically diverse

classes of students, may reinforce or strengthen diversity culture. The connection is

depicted as a dotted line, because the effect of failing to achieve diverse student

enrollment is unclear.

As discussed above, study findings also provide evidence to support the original

elements of the conceptual model. Furthermore, because factors known to facilitate

effective holistic review were incorporated into the model, study results add support for existing recommendations, which include advancing holistic review through outreach, supporting students beyond the admissions process, and monitoring diversity-related outcomes (Addams et al. 2010; American Association of Colleges of Nursing 2016; Association of American Medical Colleges 2019; Glazer et al. 2016; Wros and Noone 2018). With respect to leadership, leader beliefs and organizational culture are interrelated (Schein and Schein 2017); therefore, within the parameters of case examination, an appreciation for leader attitudes was sought as evidence for diversity culture, and leader actions were considered in the wider context of program practices. Despite this approach, study results suggest that leader efforts to promote diversity are among the factors that can have a significant impact. Thus, prior insight about the need for leader buy-in (Glazer et al. 2016; Wros and Noone 2018) was also supported. Although beyond the scope of our analysis, future examination of the specific influence of program level leaders on holistic review may prove valuable.

Aside from supporting current guidance related to holistic review, this study offers an initial conceptual model for consideration and future examination and, through its illustration of diversity culture, may enhance health professions educators' understanding of what successful holistic review practices require. Additionally, comparing holistic review across two programs produced potentially meaningful new insights that may be translated into practical suggestions for consideration as well as the culmination of case study methodology, propositions for further evaluation.

- A commitment to service (e.g., in the community, through involvement in pipeline programs) may enhance diversity culture and strengthen efforts to enroll URM students.

- Key informants or champions for diversity can significantly influence or shape the application evaluation process. Therefore, recruiting such individuals or having them assume a leadership role in admissions may increase the effectiveness of practices aimed at increasing URM enrollment.

- Incorporating a question into the admissions application that provides applicants the opportunity to explain academic deficiencies may increase the racial and ethnic as well as socioeconomic diversity of those considered for and consequently offered admission to the program.

- Programs committed to diversity can welcome and may attract URM candidates by incorporating diverse groups of students into the interview experience.

Diversity culture may not be sufficient to achieve diverse student enrollment; however, it appears to be a significant driving force and may be a necessary condition for success. Marc Nivet (2012), former Association of American Medical Colleges Chief Diversity Officer, has observed that a huge disparity exists between declared commitments to diversity and demonstrable evidence of improvement. In relation to holistic review, going beyond mission statements and strategies and focusing attention on cultivating greater appreciation for the value of diversity may help achieve more meaningful progress. Utilizing appropriate practices is an undeniably important aspect of

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holistic review; however, based on study findings, it is difficult to envision a circumstance where that strategy alone is highly effective.

Although organizational culture may seem entrenched, as demonstrated by Indiana University School of Medicine's (IUSM's) innovative approach to fostering a culture of compassion, respect, and collaboration, change is possible (Cottingham et al. 2008). It is interesting to note that at IUSM, their process of effecting culture change – which involved the use of modest interventions designed to prompt reflection on instances of desired attitudes and behaviors already being exhibited within the school – inspired several new initiatives. These initiatives included revising the admissions process to promote identification and selection of students whose attributes aligned with new cultural priorities (Cottingham et al. 2008). Whether a focus on diversity culture would elicit similar changes is uncertain; however, for the benefits of holistic review to be realized more broadly, greater appreciation for diversity culture and explicit conversations about its role in admissions are likely needed.

Box 1

Core Principles of Holistic Review*

1. Selection criteria are broad-based, are clearly linked to school mission and goals, and promote diversity as an essential element to achieving institutional excellence.

2. A balance of applicant experiences, attributes, and academic metrics (E-A-M)
    a. Is used to assess applicants with the intent of creating a richly diverse interview and selection pool and student body;
    b. Is applied equitability across the entire candidate pool
    c. Is grounded in data that provide evidence supporting the use of selection criteria beyond grades and test scores

3. Admissions staff and committee members give individualized consideration to how each applicant may contribute to the school learning environment and to the profession, weighing and balancing the range of criteria needed in a class to achieve the outcomes desired by the school.

4. Race and ethnicity may be considered as factors when making admission-related decisions only when such consideration is narrowly tailored to achieve mission related educational interests and goals associated with student diversity and when considered as part of a broader mix of factors, which may include personal attributes, experiential factors, demographics, or other considerations.[a]

Source: Urban Universities for HEALTH 2014. Originally adapted from the Association of American Medical Colleges "Roadmap to excellence: Key concepts for evaluating the impact of medical school holistic admissions," 2013. Reused with permission from the Association of American Medical Colleges.

[a]Under federal law (and where permitted by state law); seven states have banned the use of race in admissions. These states are: Washington, Michigan, Nebraska, Arizona, New Hampshire, California and Florida.

Figure 1

Conceptual Model Depicting the Relationships between Organizational Culture, Program

Outcomes, and Program Practices
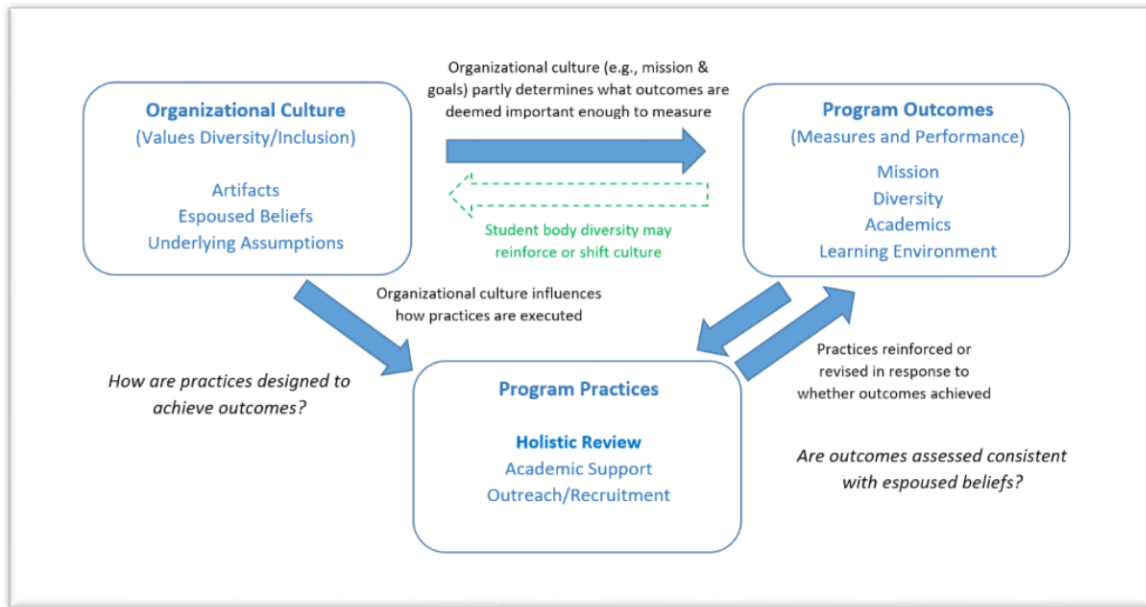
Table 1

Comparison of Program Characteristics and Admissions Requirements

Characteristics	Program 1	Program 2	Comments
Location	Urban area with racially/ethnically diverse population	Urban area with racially/ethnically diverse population	Programs 1 and 2 located in the same U.S. Census Bureau Division
Funding	Private, nonprofit	Private, nonprofit	
Type of institution	Housed in a university focused on health sciences	Housed in a school of medicine	Both program's universities have an Office of Diversity and Inclusion
Time period program established	1990s	1970s	
Faculty demographics	Few minority faculty members	≈ 50% of faculty members are minorities	Program 2 has ≈ twice the number of faculty as Program 1
Length of program compared to national average (26.7 mos)	Program duration approximates national average	Program duration longer than national average	
Number of students per class (national average is 47.3)	Class capacity is between 40-50	Class capacity is between 50-60	
Average GPA of matriculants compared to national average (3.57)	Lower	Lower	
Tuition compared to national average for private programs ($87,160)	Higher tuition than national average	Higher tuition than national average	
Availability of scholarships	• University has been awarded a HRSA[d] Scholarships for Disadvantaged Students grant (PA students eligible)	• Program has been awarded a HRSA[d] Scholarships for Disadvantaged Students grant	For both programs, scholarships are awarded after matriculation (students are not offered scholarships when accepted as an incentive to attend)

Availability of scholarships	• University provides need-based scholarship ($10,000 per yr.) to 2 African American or Hispanic PA students per cohort	• Program has had numerous National Health Service Corp recipients	
5-year first time taker average PANCE pass rate (national average 96%)	95%	96%	
Student demographics	Racial URMs[b]: 24% African Americans: 7% Hispanics/Latinos: 22%	Racial URMs[b]: 12% African Americans: 5% Hispanics/Latinos: 34%	Reflects first-year students in 2017[c]
Admissions Requirements			
Degree	Bachelor's degree	Bachelor's degree	
Prerequisite coursework	Biological sciences	Biological sciences	
Minimum GPA	3.0	3.0 (Minimum science GPA 2.75)	
Clinical experience	Experience associated with direct patient contact (paid or volunteer)	Preferred	
PA shadowing	50 hrs	Preferred	
GRE or MCAT	Not required	Required (no minimum score required)	Program 2 considering eliminating GRE/MCAT requirement

Table reflects program characteristics at time of program site visits in 2019

[a]U.S. Census Bureau Division population demographics obtained from Henry J. Kaiser Family Foundation 2016

[b]Racial URMs = students identified as African American, American Indians or Alaskan Natives, Native Hawaiians or other Pacific Islanders, or multiracial

[c]Once program identities were known, publicly available PA program data from the National Center for Education Statistics Integrated Postsecondary Education Data System (https://nces.ed.gov/ipeds/) were assessed to confirm that 2017 student demographics were comparable to student demographics in the preceding 3 years

[d]Health Resources & Services Administration

Table 2

Data Collection

Data sources	Both Programs	Program 1	Program 2
Texts and artifacts	Program webpages, University webpages; Displays (e.g. photos); University brochures; Admissions interview scoring sheet	Document containing program goals and related outcomes; Brochures distributed to candidates on day of interview; Scoring sheet for team-decision making activity that occurs as part of the interview	Program's separate student-run webpages; Affiliated medical school webpages Program magazine; Pipeline program brochure; Initial application screening matrix; Supplemental application; 32-page packet focused on outreach/pipeline efforts
Observations	Tour of campus; Faculty meeting where admissions-related topics discussed; Informal observations while onsite	Interview day	On-campus student-led presentation for pre-PA students on campus; Off-campus faculty-led presentation for pre-PA students off campus
Focus group	7 first-year URM students		
Interviews		6 faculty members incl. program director 1 program staff member 1 university admissions department staff member 1 Office of Diversity and Inclusion staff member	7 faculty members incl. both admissions selections committee co-chairs and the program director (who is one of the admissions co-chairs) 4 program staff 1 third-year student who has interviewed applicants during prior admissions cycles

Other		Informal meeting with staff member in the financial aid office	

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CHAPTER 5

DISCUSSION

Summary and Chapter Linkages

The purpose of this program of research was to explore use of holistic review in

PA program admissions to gain insights useful to PA and other health professions

programs seeking to increase enrollment of URMs. A review of the literature related to

holistic review and overview of the conceptual model introduced in the research was

presented in Chapter 1 to provide background and justification for the studies conducted.

Chapter 2 described the rationale for a diverse overall and PA health workforce,

discussed challenges associated with increasing URM participation in health professions

education, and emphasized the need for greater URM representation among PAs to

improve the quality of health care delivered to medically underserved patients (Coplan

and Fleming 2019). The Chapter 2 paper also was meant to draw attention to the issue of

insufficient diversity in the PA profession and advocate for research and strategies to help

address the problem. Since the paper was published in May of 2019, one of the included

recommendations – development of a PA program accreditation standard to support

diversity – has in fact come to fruition. The newly adopted fifth edition of accreditation

standards for PA programs, which goes into effect on September 1, 2020, now states that

a PA program's sponsoring institution "…must demonstrate its commitment to student,

faculty and staff diversity and inclusion…" by supporting the program in defining goals

for diversity and inclusion, implementing recruitment and retention strategies, and

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making resources available (Accreditation Review Commission on Education for the Physician Assistant 2019, p. 7).

Chapter 3 (the quantitative survey study) addressed the need for research on efforts to promote diversity in the PA profession and, as the first study to evaluate holistic review in admissions across all educational programs in a health profession, generated knowledge about the association between program use of holistic review practices and URM enrollment that also may be of interest to nursing and other types of educational programs. In addition, study results established a connection between use of holistic review and URM student attendance at PA programs consistent with evidence related to holistic review and URM enrollment in other professions. This evidence suggests that some programs that use holistic review admit relatively high proportions of URM students while others do not.

Chapter 4 (the qualitative multiple case study) also addressed the need for research on interventions that have the potential to increase URM participation in PA education. This study evaluated and refined an initial conceptual model for holistic review that advances understanding of the relationship between an organizational culture that values diversity and inclusion and holistic review practices that successfully achieve enrollment of diverse classes of students. Study findings shed light on one of the potential reasons that some educational program's holistic review admissions practices appear to more effectively promote racial and ethnic diversity among students than others.

In the remainder of this final chapter, each study's major research findings are reviewed and discussed, and study strengths and limitations are described. Next, an

overview of findings and research contributions to the PA profession and field of nursing and health innovation are discussed. Finally, the chapter concludes with a discussion of implications for practice and future research.

Quantitative Survey Study: Holistic Review across PA Programs

Major Findings

As described in Chapter 3, a majority (77.5%) of PA program respondents to the survey reported using holistic review in admissions. Holistic review practices were associated with proportions of enrolled first-year students identified as URM. Study data on student race and ethnicity were reported separately; therefore, in order to determine proportion of URM students, we calculated each program's percentage of first-year students identified as Hispanic/Latino, African American, and as racial URMs (i.e., total of African American, American Indian or Alaska Native, Native Hawaiian or Pacific Islander, and multiracial students). Although we found associations between PA program holistic review practices and URM student attendance, they were modest and variable. For example, the overall use of holistic review in admissions (determined by a yes or no response) weakly correlated with program proportion of Hispanic/Latino and racial URM students; however, it did not correlate with proportion of African American students. Additionally, when accounting for programs' regional population demographics, use of holistic review (compared to not using it) was associated with higher odds of Hispanic/Latino, African American, and URM student matriculation; however, the odds ratio for African American students did not reach statistical significance. Elements of holistic review that modestly correlated with African American student enrollment –

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including consideration of the race and ethnicity composition of entering classes and level of commitment to program diversity (as determined by responses to three diversity-related questions) – were not associated with Hispanic/Latino student enrollment.

The weak relationship between holistic review practices and program proportion of URM students was consistent with the additional study finding that, among PA programs experienced at using holistic review (i.e., using it five years or more), just 40.3% reported that it resulted in increased racial and ethnic diversity among students. In addition, among all programs using holistic review, a minority reported that they consider applicant first generation college (32.0%) or socioeconomic status (31.4%). Consideration of these attributes as part of holistic review has been associated with increased diversity among students admitted to health professions programs (Felix et al. 2012; Urban Universities for HEALTH 2014; Wrose and Noone 2018; Zerwic et al. 2018). Thus, many PA programs engaging in holistic review may not have intentionally or effectively incorporated selection criteria likely to promote admission of URM applicants. Notably, 16.6% of programs that reported using holistic review had no racial URM first-year students, and 16.7% had no first-year Hispanic/Latino students. That said, the proportion of first-year racial and/or ethnic minority students at several programs using holistic review was substantial (e.g., > 20%).

Discussion

Study findings add to the evidence suggesting that the specific practices used as well as other influences likely contribute to whether holistic review in admissions successfully increases URM participation in a health professions educational program

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(Artinian et al. 2017; Glazer et al. 2018; Urban Universities for Health 2014). Perhaps most telling was the finding that just 40.3% of PA programs using holistic review five years or more reported that it was associated with increased racial and ethnic diversity among admitted students. This finding suggests that a majority of PA programs either do not use holistic review for the purpose of improving URM student enrollment or have been unsuccessful at achieving this outcome. A higher percentage of PA programs reported that using holistic review resulted in greater socioeconomic diversity among students (45.5%), but the only benefit reported by a majority was enhanced learning environment (51.9%).

Although some programs may have had diverse classes of students prior to adopting holistic review, overall lack of URM participation in PA education suggests that the vast majority did not. Additionally, while other interventions to promote diversity (unrelated to holistic review) were not assessed, the demographics of the overall PA student population suggest that existing diversity-related efforts in general have yet to make a substantial impact (DiBaise et al. 2015). Consequently, in addition to providing some insight into the utility of holistic review, study results suggest that more work is needed to diversify the PA workforce.

Another troublesome study finding was that overall use of holistic review was not significantly associated with African American student matriculation. This result is consistent with the fact that, despite widespread use of holistic review, African American participation in PA education has substantially declined over the last 15 years (Coplan et al. 2018). The finding is also consistent with evidence derived from other types of health

professions programs. For example, Zerwic et al. (2018) found that adoption of holistic review in their nursing program was associated with a 10% increase in the percentage of Hispanic/Latino students admitted but had no impact on African American student admission rates. Similarly, Grbic et al. (2019) found a positive relationship between medical school participation in a holistic review workshop and percentages of Hispanic/Latino and first-generation college student matriculants; however, the percentage of African American matriculants among workshop participants did not significantly change. Taken together, data suggest that lack of intentional or effective implementation of holistic review has the greatest impact on African Americans. Another possibility is that African Americans face unique barriers to accessing health professions education that current holistic review practices do not adequately address.

Strengths and Limitations

Data for the study were derived from the 2017 Physician Assistant Education Association (PAEA) annual PA Program Survey, which was distributed to all PA programs in the United States. All but two of the 223 PA programs with provisional or continuing accreditation at the time of the study responded to questions related to holistic review (99.1% response rate) and 196 of the 218 programs with students (5 provisionally accredited programs did not yet have students) provided usable data on student race and ethnicity (89.9% response rate); therefore, PA program representativeness was a significant study strength. The study also had some limitations. External researchers are only permitted to add ten questions to PAEA's annual PA Program Survey. The benefit of doing so is that the annual Survey generally garners an overall response rate of 100%.

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Therefore, researchers obtain high response rates for incorporated questions, as we did. A drawback is that the scope of inquiry is limited. Additionally, data were derived from a single academic year; therefore, we were unable to gauge trends potentially more reflective of usual URM matriculation.

As discussed in Chapter 3, some features of the data also limited analysis. Because race and ethnicity are reported separately in the PA Program Survey (Physician Assistant Education Association 2018), we could not assess each program's total percentage of first-year URM students. Data also were subject to self-report bias inherent in all survey research and, because specific PA program locations may reveal program identify, we were only given programs' U.S. Census division locations (divisions 1 through 9). As a result, the control variable we used to account for the influence of program location population demographics on URM student enrollment had low geographic specificity. Finally, due to the nature of the study (i.e., use of a limited number of survey questions), we were unable to explore individual program factors, such as program culture and level of administrative support, that likely significantly influence holistic review outcomes. Despite these limitations, the study revealed the extent of holistic review use across PA programs and produced some insight about approaches to and outcomes associated with use of holistic review practices in PA program admissions.

Qualitative Multiple Case Study: Holistic Review and Organizational Culture

Major Findings

Analysis of the Chapter 4 study data revealed that the two case study PA programs (which were known to have high URM enrollment) have strong diversity

culture evidenced in part by staff and faculty values and attitudes which influence admissions selections decisions (Christensen et al. 2018). Diversity culture also appears to have strongly influenced the approach to and design of each program's holistic admissions process as well as other practices, including outreach and recruitment and academic support, that support the goal of admitting and educating diverse classes of students. For instance, both programs regularly engage in community service and outreach activities; both are involved with a pipeline program, and both reach out to students after an initial examination failure to determine what resources the student may need to be more successful. With regard to outcomes, in addition to monitoring traditional measures of success such as student academic performance, both programs also informally assess class diversity and had revised their admissions practices to improve URM enrollment. Thus, the conceptual model linking diversity culture with holistic review and other program practices that effectively support enrollment of diverse classes of students was supported.

Analysis also showed that diverse classes of students, who were at one program described as social justice oriented, appear to reinforce or strengthen diversity culture. They exert influence through the extracurricular activities and outreach they pursue – such as mentoring youth from diverse communities – and by contributing their perspectives and stories to the classroom, which serves to enhance student, staff, and faculty appreciation for diverse life experiences. In response to this finding, as shown in Chapter 4, we revised the conceptual model to reflect the influence students may have on culture.

Through case study examination, other potentially important program similarities also were identified that may provide insight to health professions educational programs who use or are considering using holistic review. As noted in Chapter 4, these similarities include: 1) diversity culture enhanced by a commitment to service, 2) a champion for diversity in a leadership role in admissions, 3) having a question in the admissions application that allows applicants to explain academic deficiencies, and 4) current program student participation in the interview experience (see Box 1). In addition, we found that the program director at each case study program values and embraces diversity and inclusion and appears to be instrumental in facilitating and supporting diversity-related efforts, including holistic review.

Discussion

Study findings supported the proposition that diversity culture is among the influences that facilitate holistic review practices that successfully promote URM student admission and resultant participation in health professions educational programs. Furthermore, study results supported existing recommendations related to holistic review including the need to measure related outcomes and support admissions practices through outreach and recruitment and by providing academic support once students have been admitted (Addams 2010; Glazer et al. 2016; Glazer et al. 2018; Scott and Zerwic 2015; Wros and Noone, 2018). As noted above, the research also introduced an initial conceptual model and produced new insights that may help encourage adoption of effective holistic review practices.

Box 1

Propositions Derived from Qualitative Multiple Case Study
1. A commitment to service (e.g., in the community, through involvement in pipeline programs) may enhance diversity culture and strengthen efforts to enroll URM students.
2. Key informants or champions for diversity can significantly influence or shape the application process. Therefore, recruiting such individuals or having them assume a leadership role in admissions may increase the effectiveness of practices aimed at increasing URM enrollment.
3. Incorporating a question into the admissions application that provides applicants the opportunity to explain academic deficiencies may increase the racial and ethnic as well as the socioeconomic diversity of those considered for and consequently offered admission to the program.
4. Programs committed to diversity can welcome and may attract URM candidates by incorporating diverse groups of students into the interview experience.

Strengths and Limitations

The main goal for case study selection was to identify PA program cases that best exemplified the issue under study – diversity culture and holistic review admissions practices associated with high URM student enrollment. A secondary priority aimed at enhancing transferability was to identify one public program and one private program in different geographic locations, due to the potential for program funding status (i.e., public or private) or location to influence URM attendance (Creswell and Poth 2018). In order to maintain best case selection criteria and integrity of case study methodology, it was necessary to select two private PA programs located in the same regional geographic area. Nonetheless, as discussed in Chapter 4, we sought to test our conceptual model; therefore, the primary sampling strategy was based on conceptual as opposed to representativeness grounds, such that generalizations made from one case to the next could be made "…on the basis of match to the underlying theory, not the larger universe"

(Miles et al. 2014, p. 33). This approach to sampling, in combination with subsequent in-depth exploration and use of directed content analysis, enabled identification of significant program commonalities linked to the conceptual model. Consequently, we were able to verify and refine the model, which promotes theoretical transfer to other program 'cases' (Miles et al. 2014)

The potential for holistic fallacy, which refers to interpreting findings as "…more patterned or congruent than they really are" (Miles et al. 2014, p. 294) is a study limitation. To address this limitation and establish conclusions that were authentic and trustworthy (reliable and valid in quantitative terms) by virtue of being reasonably and legitimately drawn from the data, several measures were undertaken to test study findings and strengthen trustworthiness. Researchers can promote trustworthiness by using a variety of tactics and addressing common standards for establishing the quality of study conclusions: objectivity (confirmability), dependability, credibility, transferability, and application (Colorafi and Evans 2016; Miles et al. 2014). The main strategies we employed are described below.

Qualitative research findings in this study were tested and confirmed by being attentive to data quality, checking for 'unpatterns,' and testing explanations (Miles et al. 2014). Tactics used to promote data quality included maintaining awareness of researcher effects on case participants and triangulating across data sources (Miles et al. 2014). To reduce researcher effects, the study and plans for dissemination were clearly explained to all participants, and the study's first author (BC), who visited each program to conduct the field work, remained onsite throughout each day of her visit to familiarize participants

with her presence and minimize their sense of intrusion. Additionally, BC made contemporaneous jottings, which are brief notes used to record researcher reflections or reactions to data (Miles et al. 2014), to document instances when she felt participants' responses to interview questions or behaviors during observations may have been influenced by her presence. She also maintained awareness of this possibility through frequent analytic memoing during data collection and analysis. As previously discussed, data were collected from multiple different participants and sources, including sources not subject to researcher effects (e.g., information derived from document review); therefore, we were also able to triangulate data in order to confirm findings.

Checking for unpatterns, which involves investigating evidence that appears to contradict identified patterns, can be accomplished by looking for negative evidence and checking the meaning of outliers (Miles et al. 2014, p. 294). As previously noted, we collected data from a variety of participants at each PA program including program faculty and students as well as staff working within the program and outside the program within the university. Consequently, we elicited a variety of perspectives and were able to investigate potential alternative explanations for high URM enrollment and explore possible reasons for inconsistent viewpoints. Investigating possible rival explanations for high URM enrollment also allowed us to test explanations, which were further assessed through identification of consistent findings across cases (Miles et al. 2014).

Objectivity, or confirmability, refers to avoiding bias wherever possible and making inevitable biases explicit; potential sources of bias include researcher effects on a case, the researcher's personal assumptions, and introduction of bias during data

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collection and analysis (Miles et al. 2014). In addition to the measures taken to reduce the influence of researcher effects on participants and data interpretation (described above), BC maintained awareness of the potential influence of her personal assumptions through use of the analytic memos she wrote during data collection and analysis. To further promote objectivity and transparency, study methods and procedures were clearly documented and described (Miles et al. 2014). Steps taken to strengthen study dependability, which refers to reliability and consistency, included utilizing a study design and analytic procedures consistent with the conceptual model, evaluating the reliability of the final coding scheme by assessing interrater domain agreement between BC and a colleague familiar with PA program admissions, confirming findings with study participants, and replicating study procedures across cases (Miles et al. 2014). Seeking negative and triangulating data supported study credibility (Miles et al. 2014). Additionally, we provided context-rich, meaningful and comprehensive descriptions of study findings, which further promote credibility as well as transferability (Miles et al. 2014). Finally, through data analysis and interpretation, we generated a list of propositions that can be readily tested or applied in other educational program settings (Miles et al. 2014).

Overview of Findings

The body of work described here highlighted complex challenges health professions programs face in their efforts to increase URM student enrollment. For example, as noted in Chapter 2, in their paths to health professions education, many URMs face barriers related to societal discrimination, educational costs, and disparities in

the quality of K-12 education (Camacho et al. 2017; White 2018). Some educational programs incorporate consideration of these challenges into holistic review practices; however, holistic review is by no means a simple solution to low URM participation in health professions programs. The review of the literature suggests that abiding by established recommendations for holistic review, such as engaging faculty and staff in education and training (e.g., through admissions workshops) and considering nonacademic attributes as part of the initial application screening are helpful; but aspects of holistic review reliably associated with increased URM enrollment were not identified.

Results of this program of research, which builds on prior work, showed that the majority of PA programs uses holistic review in admissions; however, outcomes differed considerably across programs, and the overall association between use of holistic review and URM matriculation was modest. Additional insights derived from in-depth qualitative case study analysis revealed that organizational culture appears to facilitate holistic review processes associated with high URM admission rates (relative to other programs). Thus, the overarching influence of culture may partially explain the variable utility of holistic review as a means to increase URM enrollment.

Contribution to the PA Profession

The studies conducted produced knowledge particularly useful to the PA profession. Major PA organizations, including PAEA and the American Academy of Physician Assistants, have expressed a commitment to efforts to improve URM representation in the PA workforce (AAPA 2018; PAEA 2017). The research revealed extensive use of holistic review by PA programs. Thus, holistic review in admissions is

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one effort that has significant potential to advance progress toward increasing the number of URM PAs. Nonetheless, the finding that use of holistic review was only modestly associated with URM enrollment demonstrates that more work is needed to improve the effectiveness of this approach. Findings related to PA program use of holistic review were similar to evidence derived from other health professions programs (e.g., minimal impact on African American attendance). Therefore, strategies associated with some success in other health professions, such as participation in holistic review admissions workshops, may help a greater number of PA programs achieve increased URM enrollment through admissions.

The finding that the proportion of first-year URM students was substantial at some PA programs using holistic review is compelling. It shows that PA program use of holistic review can be highly effective. Furthermore, in addition to illuminating the role of organizational culture in holistic review, the multiple case study findings demonstrated how holistic review processes associated with high URM admission rates work in PA programs. Thus, the research provides a readily applicable roadmap that PA programs may use to create practices that more effectively support URM student enrollment.

Contribution to Nursing and Health Innovation

Nursing

Over the last decade, the nursing profession in particular has made significant strides toward increasing URM representation in its workforce (American Association of Colleges of Nursing 2018). However, Hispanics/Latinos remain poorly represented within baccalaureate, master's, and doctoral nursing programs, and African Americans

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remained underrepresented in baccalaureate nursing programs where, over the last decade, the proportion of students that is African American has slightly declined (American Association of Colleges of Nursing 2018). Consequently, achieving greater diversity among nurses remains a top priority for the profession (American Association of Colleges of Nursing 2019a).

Holistic review in admissions is among the strategies the American Association of Colleges of Nursing (AACN) recommends to enhance the diversity of its workforce (American Association of Colleges of Nursing 2019a). The AACN has created several holistic admissions resources including a toolkit for nursing programs, and in 2016 began offering onsite workshops (American Association of Colleges of Nursing 2016; American Association of Colleges of Nursing 2019a). Moreover, nurse educators have been at the forefront of advocacy for holistic review and research to promote effective utilization of holistic review practices in nursing as well as other health professions educational programs (Artinian et al. 2017; Glazer et al. 2016; Glazer et al. 2018).

The quantitative survey study results highlight differences in holistic review practices and outcomes among educational programs. Although the survey was conducted with PA programs, due to similarities in the admissions process across health professions programs and research findings related to holistic review, study results are likely also relevant to nursing educational programs. For example, as appears to be the case in many PA programs, implementation of holistic review in some nursing programs has failed to yield an increase in African American enrollment (Glazer et al. 2017; Zerwic et al. 2018). Thus, the research findings support AACN efforts to educate nursing

programs about the goals of holistic review and specific practices and criteria known to promote diversity among admitted students.

The qualitative multiple case study introduced a new conceptualization of the holistic review process that provides insight into the influence of organizational culture. Study results suggest that a stronger focus on cultivating program appreciation for diversity and inclusion may help facilitate holistic review as well as other program practices that effectively support diverse student enrollment. As previously discussed, while the multiple case study also focused on PA programs, cases were not selected on the basis of representativeness of the wider universe of educational programs. Rather, the main focus was to include programs that allowed for analysis of the conditions under which the theory operates (Miles et al. 2014, p. 33). Therefore, because study findings supported the conceptual model, they promote transfer of theoretical constructs to other contexts.

In addition to the study's contribution to theory, the findings paint a picture of holistic review in practice and offer insights (or propositions) that may help PA, nursing, and other educational programs shape their approach to admissions and other efforts to promote diversity. In relation to the propositions, among the holistic review resources the AACN (2019b) provides are sample application essay prompts. One of the prompts suggested, "Explain the academic challenges, success, or obstacles in your life that impacted your ability to achieve your goals," (AACN 2019b) resembles the question asking applicants to explain academic deficiencies that both of the case study PA programs have incorporated into their admissions applications. Thus, the multiple case

study findings also support AACN efforts. Findings may also be used to revise or add to the suggestions the organization provides.

Overall, the additional knowledge related to holistic review that the dissertation research provides may be useful to educators and policymakers across health professions. Additionally, the impetus to conduct a multiple case study and develop a conceptual model for holistic review was derived primarily from calls from nurse educators (Artinian et al. 2017; Glazer et al. 2016). Therefore, the research also represents the influence of nursing, outside of the profession, on scholarly inquiry that may benefit the overall health workforce and, as result, improve patient care.

Health Innovation

According to the World Health Organization (2019),

Health innovation is to develop new or improved health policies, systems, products and technologies, and services and delivery methods that improve people's health, with a special focus on the needs of vulnerable populations. It aims to add value in the form of improved efficiency, effectiveness, quality, sustainability, safety and/or affordability.

Use of holistic review as a means to select students who will most effectively contribute to an optimal educational and clinical environment represents a shift from the traditional approach to health professions program admissions (Brenneman et al. 2018; Conrad et al. 2016; Zwick 2017). Thus, holistic review may be viewed as an innovation. The knowledge generated by the research enhances understanding of holistic review practices and thus may promote further innovation in approaches to improving their utility. In

addition, the propositions that emerged from the study can be readily adopted and evaluated. Furthermore, the main goal of holistic review is to promote development of a health workforce that, by virtue of being more diverse, will better serve vulnerable populations (Association of American Medical Colleges 2019). Thus, efforts to strengthen the ability of holistic review to help produce a more diverse workforce may advance one of the main goals of health innovation – improving the quality of care for medically underserved populations (World Health Organization 2019).

Implications for Practice and Future Research.

Recommendations for Practice

This research suggests that more education and training is needed for the holistic review outcome of increased URM enrollment to be achieved in PA (and perhaps other types of) educational programs. Thus, similar to the AACN and Association of American Medical Colleges, PAEA, which advocates for diversity and inclusion, should develop and promote resources to facilitate implementation of holistic review practices most likely to be effective. As previously noted, accreditation standards will soon require PA program institutions to demonstrate a commitment to diversity and inclusion, in part by implementing recruitment and retention strategies (Accreditation Review Commission on Education for the Physician Assistant 2019), to which holistic review may contribute. Therefore, PAEA should immediately consider promoting the comprehensive resources developed by other health professions educational organizations. Additionally, since diversity is of vital importance to all health professions (Mitchell and Lassiter 2016; Vick et al. 2018), educational organizations should consider collaborating in their efforts to educate and train programs. For example, resource-intensive onsite holistic admissions

workshops could be delivered to administrators, faculty, and staff from multiple different health professions programs at a single institution, which may facilitate further collaboration within an institution, leading to improved outcomes across programs.

Insights derived from the research also suggest that new approaches to holistic review are needed. One approach identified that may be translated into practice is recruiting leaders committed to diversity and inclusion and recruiting champions for diversity to play a leadership role on admissions committees. On October 21, 2019, the PAEA jobs site listed more than 50 PA program faculty vacancies including six program director openings. These positions offer institutions and programs opportunities to strengthen diversity-related efforts, including holistic review, by selecting candidates whose experiences and values are aligned with creating and supporting diverse learning environments. Based on the case study findings, programs may also want to consider reflecting on their values and commitment to service to determine whether revising current practices or adopting new ones may help advance efforts to increase URM representation among admitted students. Additionally, study findings suggest that incorporating a question into the admissions application that allows applicants to explain academic deficiencies and including diverse groups of students in the interview experience may help programs committed to diversity enroll more URM students.

Future Research

For the benefits of holistic review to be realized more broadly, more research is needed to inform efforts to advance use of admissions practices that effectively achieve increased URM participation in health professions education. The dissertation research

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findings point to fruitful areas for further study. They include: 1) approaches to establishing diversity culture, 2) evaluation of the proposed conceptual model for holistic review, 3) further exploration of factors that influence African American participation in health professions education, 4) further evaluation of the propositions generated in the qualitative multiple case study, and 5) examination of the role program leaders play in facilitating diverse student enrollment.

Diversity culture. While quantitative study findings showed that some PA programs using holistic review admit significant numbers of URM students and others do not, in-depth qualitative exploration improved understanding of why this might occur. Data analysis revealed that an organizational (or program) culture that values diversity and inclusion may be an essential antecedent to development of holistic review and other program practices that effectively support admitting and educating diverse classes of students. Study findings also provide insight into diversity culture; for example, committing to improving health care in underserved communities and having diverse classes of students and diverse perspectives represented among faculty and staff appear to strengthen diversity culture. The study did not, however, focus on how true appreciation for diversity and inclusion is established.

Although changing culture is a difficult and complicated endeavor that takes years to accomplish (Breslin et al. 2018), this dissertation research suggests that a culture appreciative of diversity and inclusion may be essential to improving URM representation among health professions students and, subsequently, the health workforce. In their paper focused on their efforts as nursing and organizational leaders to

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create organizational cultures attentive to diversity, inclusivity, and equity in nursing schools, Breslin and colleagues (2018, p. 103) described strategies that leaders can use to cultivate "cultural proficiency," defined as a focus on diversity and inclusion enhanced by a commitment to examining organizational practices and policies and individuals' values and behaviors (2018, p. 104). Their recommendations, which included creating a new paradigm, acknowledging the history that informs organizational culture, and developing the right team to champion the work (Breslin et al. 2018), provide useful information as do articles focused on assessing an organization's culture of diversity and inclusion (Aysola et al. 2018; Murdoch-Kinch et al. 2018). However, research evaluating the success of various approaches to establishing diversity culture is important to help organizations effectively target their efforts.

As discussed in Chapter 4, Cottingham and colleagues (2008) completed a case study to assess the Indiana University School of Medicine's (IUSM's) efforts to create a more caring, respectful, and collaborative culture. Although they did not focus on diversity and inclusion, their evaluation provides useful information about strategies that may be effective for aligning individuals' values, beliefs, and actions with a desired culture (Cottingham et al. 2008). Rather than a typical 'top-down' approach, they collected and disseminated stories reflective of the culture the school sought to cultivate that were already present in the school (Cottingham et al. 2008, p. 715). Evidence for the effectiveness of their approach was demonstrated partially through new initiatives that seemed to be prompted by cultural change. These initiatives included the school's admissions committee redesigning the admissions process to facilitate recruitment and

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selection of applicants whose attributes aligned with new cultural values and goals (Cottingham et al. 2018, p. 717). This outcome, in combination with the multiple case study results presented here, suggest that research on the impact of focusing on creating a culture that authentically values diversity and inclusion as part of the initial approach to holistic review would be advantageous.

Conceptual model. Because holistic review practices are linked to a program's mission or goals, they are individualized and therefore not strictly prescribed (Association of American Medical Colleges 2019). Thus, the general nature of the conceptual model tested and refined in the multiple case study promotes adaptability to a variety of settings. However, additional research is required to support the model's utility. Evaluating the model in the context of different settings, for example, is needed to demonstrate its applicability to other health professions programs or illuminate areas for further development. Additionally, research focused on various aspects of the model, such as establishing diversity culture (as discussed above) or evaluating specific approaches to academic support or outreach that support holistic review practices, could be incorporated into the model to provide more detailed guidance on how to develop and implement effective strategies. Conversely, the model could be incorporated into existing recommendations for holistic review to enhance understanding of the role of organizational culture and the relationships between practices and processes that support diverse student enrollment.

African American student participation in the health professions. The programs included in the multiple case study had proportions of first-year African

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American students reflective of the percentage of African Americans in the programs'
regional geographic location; however, as discussed above, findings from the survey
study involving the vast majority of PA programs suggest that, similar to use of holistic
review in other health professions programs, use of holistic review in PA program
admissions has a negligible impact on African American student enrollment.

Considering the substantial health disparities experienced by African Americans,
which include a shorter life expectancy compared to non-Hispanic whites and higher
death rates from heart disease, stroke, cancer, influenza, and pneumonia (U.S.
Department of Health and Human Services 2019), ongoing lack of African American
participation in multiple types of health professions programs is of significant concern.
With regard to preparation for health professions education, in addition to societal
discrimination and educational barriers (Camacho et al. 2017; White 2018), African
Americans may face other obstacles to participation in health professions education
including lack of exposure to healthcare careers, few role models, and reluctance due to
perceived racism in the healthcare environment (Rao and Flores 2007).

While pipeline and mentorship programs have demonstrated some success in
supporting African American students (Bouye et al. 2016; Snyder et al. 2018), little
evidence exists to support existing approaches to admissions practices that specifically
encourage African American student enrollment. Thus, more research is needed to
advance understanding of factors that contribute to low African American admission
rates in many health professions programs, even among those using holistic review.
Moreover, to achieve significant progress toward increasing the numbers of African

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American healthcare professionals, new approaches to recruiting, admitting, and retaining African American students are likely needed. One might argue that the best recruitment strategy is retention. In other words, a greater number of successful African American graduates, resulting in more role models and mentors and greater awareness of healthcare careers among African American youth, is likely to lead to an increase in the number African Americans applying to health professions programs.

Propositions to facilitate effective admissions practices. While the propositions related to holistic review that were generated in the multiple case study (see Box 1) appeared to encourage URM enrollment in the PA programs studied, further research is needed to assess their effectiveness. For example, to test the first proposition, an educational program seeking to improve appreciation for diversity and inclusion and increase diversity among admitted students may evaluate whether incorporating a focus on service to underserved communities (e.g., through community outreach or by developing or engaging with a local pipeline program) led to an increase in URM student applications. Additionally, comparing URMs enrollment in educational programs focused on serving diverse communities to the same measure in programs without a focus on service may provide more generalizable insights.

In relation to the make-up of admissions committees, existing research suggests that diversity among members likely promotes acceptance of more URM applicants (DiBaise et al. 2015; Smedley et al. 2004); however, a study on the influence of having a champion for diversity (i.e., someone with insight into underrepresented communities

and committed to supporting individuals from these communities) may enhance understanding of the role champions play in admissions.

Studies to evaluate the last two propositions could also be designed. Research similar to studies that have assessed differences in the demographics of applicants selected for interview based on whether or not initial applications were reviewed holistically could be conducted to assess the impact of reviewer evaluation of responses to a question seeking explanation for academic difficulties. Finally, a comparison of the perceptions of admitted URM students who, as applicants, interacted with diverse groups of current program students during interview experiences to the perceptions of those who did not may provide additional insight into whether these types of interactions influence applicants' decisions to attend a program.

Educational program leadership. While the need for supportive leadership has been discussed in the literature related to implementing holistic review (Artinian et al. 2017; Glazer et al. 2016), little attention has been paid to the specific influence of program level leaders. Although an analysis of leadership was beyond the scope of the dissertation research, the multiple case study findings revealed that the program leaders (i.e., program directors) significantly contributed to shaping admissions practices, for example by determining who would lead the admissions process. They also appeared to play a substantial role in promoting program diversity in part by recruiting URM staff and faculty and providing support for outreach and recruitment efforts. Based on these findings, research focused on the relationship between program level leadership and diverse student enrollment may be valuable.

Conclusion

      This body of work addressed the urgent need for greater URM representation in the PA and overall health workforce and investigated a widely used approach, holistic review in admissions, that has the potential to help address the problem. A review of the literature revealed that educational programs across several professions have used various holistic review admissions practices to successfully increase URM admission rates; however, despite widespread use of holistic review, URM representation within much of the health workforce is not significantly improving.

      This mixed methods program of research confirmed that, like medical, dental, and pharmacy schools (Urban Universities for HEALTH), a majority of PA programs report using holistic review; however, similar to evidence drawn from other health professions, study findings showed that use of holistic review in PA program admissions was not consistently associated with URM enrollment. Further analysis through in-depth qualitative inquiry revealed how organizational culture facilitates holistic review and other program practices that support enrollment of diverse classes of students. Consequently, the research helps explain why some educational programs who use holistic review appear to have greater success enrolling URM students than others.

      Overall, the research not only advances understanding of holistic review practices and their utility, through a newly proposed conceptual model that was tested and refined, it offers a theoretical understanding of holistic review processes that successfully achieve the intended goal of increasing URM enrollment. Through this model, it is evident that a culture that values diversity and inclusion may be key to creating effective program

practices. Additionally, use of the model produced new insights related to the influence of program leaders, champions for diversity, and current students. Overall, the findings suggest that additional research on specific holistic review practices and ongoing education and training may be beneficial. However, new approaches to admissions practices and shifting focus toward creating appreciation for diversity and inclusion will more likely promote meaningful progress to creating a diverse, and therefore more effective, health workforce (Sullivan 2004).

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APPENDIX A

HOLISTIC REVIEW SURVEY ITEMS*

1. Our admissions policies, processes, and practices explicitly link admission decisions to the mission and goals of the institution, school, or program.
   Strongly disagree   Disagree   Agree   Strongly agree

2. Our institution, school, or program has formal statements that articulate the benefits of diversity for our institution, school, or program.
   Strongly disagree   Disagree   Agree   Strongly agree

3. The program admissions committee explicitly considers how an applicant would contribute to the learning environment at our school or program.
   Strongly disagree   Disagree   Agree   Strongly agree

4. The admissions committee explicitly considers how an applicant would contribute to the field after their training.
   Strongly disagree   Disagree   Agree   Strongly agree

5. The admissions committee explicitly takes into account the composition of the entering class in terms of race and ethnicity when making selection decisions.
   Strongly disagree   Disagree   Agree   Strongly agree

6. How are program applicants selected for an interview?
   a. *Faculty member recommendation after review of applicant's complete file*
   b. *Staff recommendation after review of applicant's complete file*
   c. *Automatic invitation based on meeting minimum academic requirements*
   d. *Automatic invitation based on meeting minimum academic requirements and other minimum requirements (e.g., citizenship, residency, certain types of experiences)*
   e. *Other, please describe:*

7. With regard to criteria for admissions to your program, which of the following statements best describes your program's approach to the <u>initial</u> screening process?
   a. *Non-academic criteria are the most important criteria during the initial screening process*
   b. *Non-academic criteria are somewhat more important than academic metrics during the initial screening process*
   c. *Non-academic criteria and academic metrics are equally important during the initial screening process*

    d. *Academic metrics are somewhat more important than non-academic metrics during the initial screening process*

    e. *Academic metrics are the most important criteria during the initial screening process*

8. Which non-academic criteria related to student background or experience are considered in the initial admissions screening process? Please check all that apply. <u>Note:</u> if your program does not consider non-academic criteria related to student background or experience in the initial admissions screening process, please select "No non-academic criteria considered."

    a. *No non-academic criteria considered*

    b. *Race or ethnicity*

    c. *First-generation college graduate status*

    d. *Community of origin is medically underserved*

    e. *Gender*

    f. *Origin in geographic area specifically targeted by school*

    g. *Foreign language ability*

    h. *Socioeconomic status*

    i. *Experience working with disadvantaged populations*

    j. *Healthcare experience*

    k. *Veteran status*

    l. *Other, please describe:*

For the purposes of questions 9 and 10, the definition of holistic review is:

"A flexible, individualized way of assessing an applicant's capabilities by which balanced consideration is given to experiences, attributes, academic metrics and, when considered in combination, how the individual might contribute value as a PA student and PA." (adapted from the AAMC definition)

9. Our program's admissions policies and processes incorporate holistic review of applicants.

    a. *No, our program does not incorporate holistic review and does not plan to*

    b. *No, our program does not currently incorporate holistic review but we are considering it*

    c. *Yes, holistic review has been incorporated for 1 year or less*

    d. *Yes, holistic review has been incorporated for 2-4 years*

    e. *Yes, holistic review has been incorporated for 5 years or more*

10. Branch for respondents that selected *c, d,* or *e* in response to question 9.
    Using holistic review as part of our admissions process has impacted the program in the following ways. Please check all that apply.
    a. *Enhanced learning environment for all students*
    b. *Increased faculty and staff time dedicated to admissions*
    c. *Admission of students who are not as well prepared for success in the profession*
    d. *Diminished learning environment for all students*
    e. *Increased racial and ethnic diversity among students*
    f. *Unknown impact*
    g. *Increased socioeconomic diversity among students*
    h. *Increased awareness of sensitivity to diversity among admissions committee members*
    i. *Admission of students who have faced barriers to success in their lifetimes and who would have been excluded under traditional admissions processes*
    j. *Lower attrition*
    k. *Higher attrition*
    l. *Admission of students who are better prepared for success in the profession*
    m. *Increased need for student support services*
    n. *Negligible or no impact*
    o. *Other, please describe:*

10. Branch for respondents that selected *a* or *b* in response to question 9.
    Why does your program not use holistic review as part of the admissions process? Please check all that apply.
    a. *Holistic review was used in the past and had negative consequences, please describe:*
    b. *Our program does not have the resources to incorporate holistic review*
    c. *Holistic review is unnecessary*
    d. *Other, please describe:*

*Survey item content extrapolated from Glazer G, Bankston K, Clark A, Ying J. Holistic admissions in health professions: Findings from a national survey. Urban Universities for Health Report. 2014. https://www.nimhd.nih.gov/news-events/features/training-workforce-dev/holistic-admissions.html. Accessed June 12, 2019.

APPENDIX B

HOLISTIC REVIEW SURVEY STUDY VARIABLES

Explanatory Variables – Holistic Review (scale of measurement)	Description
Holistic Review variables adapted from Glazer 2014	

Using holistic review (dichotomous)	Response to the question below. (All "No" responses collapsed into single "No" category; all "Yes" responses collapsed into single "Yes" category.)
	
	 For the purposes of the question, holistic review is: "A flexible, individualized way of assessing an applicant's capabilities by which balanced consideration is given to experiences, attributes, academic metrics and, when considered in combination, how the individual might contribute value as a PA student and PA." (adapted from the AAMC definition)
	 • Our program's admissions policies and processes incorporate holistic review of applicants.
	     ○ *No, our program does not incorporate holistic review and does not plan to*
	     ○ *No, our program does not currently incorporate holistic review but we are considering it*
	     ○ *Yes, holistic review has been incorporated for 1 year or less*
	     ○ *Yes, holistic review has been incorporated for 2-4 years*
	     ○ *Yes, holistic review has been incorporated for 5 years or more*

Admissions linked to mission (ordinal)	Response to the following question: 1. Our admissions policies, processes, and practices explicitly link admission decisions to the mission and goals of the institution, school, or program. *Strongly disagree Disagree Agree Strongly agree*
Diversity benefit (ordinal)	Response to the following question: 2. Our institution, school, or program has formal statements that articulate the benefits of diversity for our institution, school, or program. *Strongly disagree Disagree Agree Strongly agree*
Applicant contribution to learning (ordinal)	Response to the following question: 3. The program admissions committee explicitly considers how an applicant would contribute to the learning environment at our school or program. *Strongly disagree Disagree Agree Strongly agree*

Class race/ethnicity composition (ordinal)	Response to the following question: 4. The admissions committee explicitly takes into account the composition of the entering class in terms of race and ethnicity when making selection decisions. *Strongly disagree Disagree Agree Strongly agree*
Program commitment to diversity (ordinal)	Four levels: highest level of commitment to diversity (4) = programs who use holistic review and responded *Agree* or *Strongly Agree* to questions 1, 2, and 3 (listed above); lowest level of commitment (1) = programs who use holistic review and did not *Agree* or *Strongly Agree* to any one of questions 1, 2, or 3.
Admissions criteria (ordinal)	Response to the question below. (Five levels: highest level (5) = non-academic criteria are the most important; lowest level (1) = academic metrics are the most important.) • With regard to criteria for admissions to your program, which of the following statements best describes your program's approach to the <u>initial</u> screening process? o *Non-academic criteria are the most important criteria during the initial screening process* o *Non-academic criteria are somewhat more important than academic metrics during the initial screening process* o *Non-academic criteria and academic metrics are equally important during the initial screening process* o *Academic metrics are somewhat more important than non-academic metrics during the initial screening process* o *Academic metrics are the most important criteria during the initial screening process*
Explanatory Variables – Contributing Factors (scale of measurement)	**Description**
Tuition (continuous)	Standard tuition (e.g. private programs) or resident tuition. Variable represents lowest program tuition rate.
Variables listed below derived from 2016 data obtained from the Kaiser Family Foundation; U.S. regional divisions divided into to nine areas (U.S. Census Bureau n.d.)	
Percent URMs in U.S. division (continuous)	Percent of African American, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, and multiracial residents in U.S. regional division.

Percent African Americans in U.S. division (continuous)	Percent of African Americans in U.S. regional division.
Percent Hispanics in U.S. division (continuous)	Percent of Hispanic residents in U.S. regional division.
Outcome Variables	**Description**
First-year URMs (correlation analysis = continuous; logistic regression = categorical/ count variable)	Correlation analysis: number of African American, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, and multiracial students divided by total number of students reported by race. Logistic regression: events = number of African American, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, and multiracial students; trials = total number of students reported by race.
First-year African Americans (correlation analysis = continuous; logistic regression = categorical/count variable)	Correlation analysis: number of African American students divided by total number of students reported by race. Logistic regression: events = number of African American students; trials = total number of students reported by race.
First-year Hispanics (correlation analysis = continuous; logistic regression = categorical/count variable)	Correlation analysis: number of Hispanic students divided by total number of students reported by ethnicity. Logistic regression: events = number of Hispanic students; trials = total number of students reported by ethnicity.

APPENDIX C

INFORMED CONSENT, PROGRAM

How PA Programs Successfully Promote Diversity in Admissions

My name is Bettie Coplan. I am inviting your program's participation as one of two case studies. I am conducting the case studies in order to examine the influence of organizational culture on admissions practices that yield diverse student enrollment. The overall goal is to gain insights that will inform efforts to increase underrepresented minority (URM) participation in PA education. I have been a PA educator for 12 years and am currently a faculty member for Northern Arizona University's PA program. I am also a graduate student under the direction of Dr. Gerri Lamb at Arizona State University

To conduct the case study, I will visit your program for approximately 1 week during the winter or spring of 2019 during a time convenient for the program. The study will involve: 1) reviewing program materials relevant to admissions (e.g. brochures provided to potential applicants, admissions scoring rubrics) that you are willing to share, 2) collecting background information relevant to URM student enrollment (e.g. availability of financial support) that you are willing to share, 3) the program director or a designee completing a 30-40 minute questionnaire on holistic admissions, 3) conducting interviews with faculty and staff involved in admissions who voluntary agree to participate, and if possible, 4) conducting one focus group with first-year URM students who voluntary agree to participate. I will coordinate with you or your designee to schedule interviews and the focus group during convenient times. Individuals have the right not to answer any question, and the program or any individual can stop participation at any time.

Your program's participation in this study is voluntary. If your program chooses not to participate or to withdraw from the study at any time, there will be no penalty. If your program chooses to participate, at the conclusion of the researcher's visit to the program, a $2000 honorarium in the form of a donation made to the program will be provided. Through participation, your program may benefit from gaining insights into your admissions process. In addition, insights gained from your program may help other programs increase URM enrollment. Individual participants in the study will not directly benefit from it.

The only potential risk to your program participating is identification. The study does not involve collection of any personal information, pseudonyms will be used to maintain confidentiality, and the real name of your program and individual participants will not be reported. However, faculty, staff, and students may be aware of who is participating (e.g. students will be in a focus group together) and because the PA community is relatively small, it is possible that your program may at some point be identified as a study participant. Results of this study may be used in reports, presentations, or publications but the program and individual names will not be reported.

I would like to audio record the individual interviews and focus group. They will not be recorded without permission from each individual participant. Participants can also change their minds after the interviews begin. Audio recordings will be labeled using pseudonyms.

If you have any questions concerning the research study, please contact Bettie Coplan at bettie.coplan@nau.edu or Gerri Lamb at gerri.lamb@asu.edu. If you have any

questions about your program's participation in this research, or if you feel the study has placed your program at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788.

By signing below you are agreeing to be part of the study.

Name:

Signature: Date:

APPENDIX D

INFORMED CONSENT, INTERVIEW

How PA Programs Successfully Promote Diversity in Admissions

My name is Bettie Coplan. I am inviting you to participate in an interview about the admissions process and culture at your PA program. I am conducting interviews as part of a study to examine the influence of organizational culture on admissions practices that yield diverse student enrollment. The overall goal is to gain insights that will inform efforts to increase underrepresented minority (URM) participation in PA education. I have been a PA educator for 12 years and am currently a faculty member for Northern Arizona University's PA program. I am also a graduate student under the direction of Dr. Gerri Lamb at Arizona State University.

Participation in the interview will involve me audio recording your responses to 8-12 questions about the admissions processes and culture at the PA program where you work. The interview will take approximately 1 hour and will be scheduled at a time of your convenience. You have the right not to answer any question and to stop participation at any time, even after the interview has started. Just let me know. You will not be audio recorded at any time without your permission.

Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty. Your responses will be anonymous but may be identified by your role in the program (e.g. staff, faculty, admissions committee member). However, you will not be asked to provide any personal information. The only foreseeable risk to your participation is that others may know that you have agreed to participate. In order to maintain confidentiality, a pseudonym will used to label your responses. The results of the study may be used in presentations or publications but your real name and the name of the PA program will not be used.

If you have any questions concerning the research study, please contact Bettie Coplan at bettie.coplan@nau.edu or Gerri Lamb at gerri.lamb@asu.edu. If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788.

Please let me know if you would like to participate in this research project. Your verbal agreement indicates your consent to participate.

APPENDIX E

INFORMED CONSENT, FOCUS GROUP

How PA Programs Successfully Promote Diversity in Admissions

My name is Bettie Coplan. I am inviting you to participate in a focus group involving approximately 6 to 10 first-year PA students that attend the PA program you attend. I am conducting the focus group as part of a study to examine the influence of organizational culture on admissions practices that yield diverse student enrollment. The overall goal is to gain insights that will inform efforts to increase underrepresented minority (URM) participation in PA education. I have been a PA educator for 12 years and am currently a faculty member for Northern Arizona University's PA program. I am also a graduate student under the direction of Dr. Gerri Lamb at Arizona State University.

Participation will involve me audio recording a conversation with you and other first-year PA students in the focus group. The conversation will be about students': reasons for choosing to attend your PA program, experiences of the program's admissions process, and perceptions of the PA program's culture. The focus group will take approximately 1 hour. You have the right not to answer any question and to stop participation at any time, even after the focus group has started. Just let me know. You will not be audio recorded at any time without your permission.

Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty. No one will be informed about whether or not you choose to participate. The only foreseeable risk to your participation is that other focus group members will know that you have agreed to participate and will hear your responses to questions asked during the focus group conversation. Due to the nature of focus groups, complete confidentiality cannot be guaranteed. However, you will not be asked to provide any personal information. Additionally, in order to maintain confidentiality outside of the focus group setting, a pseudonym will used to label your responses to questions. The results of the study may be used in presentations or publications but your real name and the name of the PA program will not be used.

If you have any questions concerning the research study, please contact Bettie Coplan at bettie.coplan@nau.edu or Gerri Lamb at gerri.lamb@asu.edu. If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788.

By signing below you are agreeing to be part of the study.

Name:

Signature: Date:

APPENDIX F

SEMI-STRUCTURED INTERVIEW PROTOCOL

Semi-structured Individual Interview Protocol (Derived from conceptual model)

Case pseudonym:

Individual pseudonym:

Role in program/admissions:

Length of time at the program:

Date:

1. What is your process for evaluating applicants for admission to the program?

2. How long have you been using your current process?
   Probe: What caused you to change or revise your process?

   Probe: In what ways did you change or revise the process?

3. When considering an applicant's fit for the program, what criteria do admissions committee members view as most important?

   Probe: Which of the criteria do you view as most important?

   Probe: How did the committee choose the most important criteria?

4. What parts of the admissions process do you think are most important for selecting desired applicants? Why are these parts of the process important?

5. How do you determine whether or not your admissions process for a given year has been successful?

   Probe: What measures do you use to evaluate success?

   Probe: Are any general program measures (e.g. student grades) used?

6. How does (or would) your program respond to an admissions process deemed unsuccessful?

7. How does class diversity affect the delivery and outcomes of your curriculum?

8. How does your program provide support for students who may not be as well-prepared academically as others or who have nontraditional backgrounds?

9. In what ways do your institution and program support student diversity and inclusion?

APPENDIX G

SEMI-STRUCTURED FOCUS GROUP PROTOCOL

Semi-structured Focus Group Protocol

Case pseudonym:

Number of participants:

Participant pseudonyms:

Date:

1. What factors influenced your decision to enroll in this program?

   Probe: Was the program website helpful?
   Probe: Did your interactions with faculty and staff influence your decision? What were they like?
   Probe: Did you consider the availability of financial support for attendance?

2. What was your experience of the admissions process?
   Probe: What stood out to you about the process?
   Probe: What aspects of the process were important to you? Why?
   Probe: What did you learn about the program in the interview/admissions process?
   Probe: Were you surprised by anything you learned?

3. How would you describe the culture of this program?

APPENDIX H

OBSERVATION WORKSHEET

Observation Worksheet

Location:

Event (e.g., type of meeting):

Date:

Time:

Length of observation:

Number of participants (e.g., number of faculty, staff, or students):

Main purpose of the event:

Person leading event if applicable (e.g., program director, admissions committee chair):

Process (formal or informal; structured or unstructured):

Focus of event or discussion –

Applicants (If applicants are discussed, what attributes are discussed? What concerns are raised? What arguments for or against applicant selection are made? What arguments seem to be most persuasive to those in the meeting?):

Practices/processes (If practices/processes are discussed, what is being discussed? What – if any – rationale is provided for a practice/process? What results from the discussion?):

Outcomes (If a program outcome or goal is discussed, what is being discussed? Why is it being discussed? What results from the discussion?):

Stories (If any story related to the program is told, describe the story, why it was told, and reactions to it):

Interactions (Are conversations respectful? Are multiple viewpoints offered? Are different viewpoints considered? Is there a dominant viewpoint? Where does power lie? How is consensus reached? Any evidence of discrimination):

Leader behavior:

Elements of culture that are evident (e.g., discussion of mission or goals, priorities mentioned):

Other observations:

APPENDIX I

INCLUSION OF CORE PRINCIPLES FOR HOLISTIC REVIEW

On September 12, 2019, the Director of Student Affairs Strategy and Alignment at the Association of American Medical Colleges (AAMC) and first author of the 2010 AAMC document, "Roadmap to Diversity: Integrating Holistic Review Practices into Medical School Admission Processes" confirmed through email correspondence with Bettie Coplan that the core principles for holistic review developed by the AAMC may be included in papers submitted for publication. She advised use of the adapted version of the core principles included in the 2014 Urban Universities for HEALTH report, "Holistic Admissions in the Health Professions: Findings from a National Survey." The adapted version of the core principles are shown in Box 1 in Chapters 1 and 4 of the dissertation and credited to the Urban Universities for HEALTH report and to the AAMC.

The AAMC's core principles for holistic review are publicly available on the AAMC website at the following link https://www.aamc.org/services/member-capacity-building/holistic-review. A copy of the 2014 Urban Universities for Health report can be accessed through a AAMC webpage found at this link https://www.aamc.org/what-we-do/mission-areas/diversity-inclusion/urban-universities-for-health.

A copy of the email correspondence between the AAMC and Bettie Coplan may be viewed upon request.

APPENDIX J

PERMISSION FROM MANUSCRIPT 2 COAUTHOR

October 25, 2019

Bettie Coplan, MMS, PA-C
ASU Doctorate Candidate
Associate Professor, NAU PA Program

James Stoehr, PhD
Professor, Midwestern University

To whom it may concern,

Bettie Coplan hereby has my permission to use the results of our STAR study in her dissertation. I am co-author on the corresponding manuscript entitled 'Holistic Admissions and Underrepresented Minorities in PA Programs', and she has my permission to use our work in any capacity for her doctoral curriculum.

Please contact me if you have any questions about this matter.

Sincerely,

James D. Stoehr, PhD

APPENDIX K

IRB REVIEW MANUSCRIPT 2

MIDWESTERN UNIVERSITY
Glendale Campus
19555 N. 59th Avenue
Glendale, AZ 85308
623-572-3728
azorsp@midwestern.edu

Institutional Review Board
Approval of New IRB Application

3/20/17

TO: Jim Stoehr, PhD

–

FROM:

Wendy Harrison, O.D, Ph.D.
Chair, Institutional Review Board

RE: AZ# 1007: Holistic Admissions in Physician Assistant Programs

The IRB has reviewed your proposal for an investigation in human subjects on the above titled Project. The IRB at Midwestern University (Glendale, Arizona) finds that your study fulfills the criteria for Exempt (45 CFR 46.101) ▾ review. You are approved to proceed with your project.

Any amendments or modifications to this study must first be reviewed by the Institutional Review Board. Please note that you are approved to study a maximum of 500 human subjects. Any increase in sample size must first be reviewed by the IRB. Please notify the IRB in writing if there are any incidents that occur during your research project or when you have successfully completed your study.

IRB Approval: 3/20/17
IRB Expiration: 3/19/18
Annual/final report due: 2/19/18

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APPENDIX L

IRB APPROVAL A MANUSCRIPT 3

APPROVAL: EXPEDITED REVIEW

Gerri Lamb
CONHI: Research Faculty and Staff
-
Gerri.Lamb@asu.edu

Dear Gerri Lamb:

On 11/29/2018 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	How Physician Assistant (PA) Programs Successfully Promote Diversity in Admissions
Investigator:	Gerri Lamb
IRB ID:	STUDY00009272
Category of review:	
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	• Program recruitment email-Diversity in PA Admissions, Category: Recruitment Materials; • Program/site consent-Diversity in PA Admissions, Category: Consent Form; • PAEA letter of support for recruitment-Diversity in PA Admissions, Category: Other (to reflect anything not captured above); • Collection of background info-Diversity in PA Admissions, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Individual recruitment-Diversity in PA Admissions, Category: Recruitment Materials; • Individual interview protocol-Diversity in PA Admissions, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Focus group recruitment-Diversity in PA

	Admissions, Category: Recruitment Materials;
	• Focus group consent-Diversity in PA Admissions, Category: Consent Form;
	• Protocol-Diversity in PA Admissions, Category: IRB Protocol;
	• Individual consent-Diversity in PA Admissions, Category: Consent Form;
	• Questionnaire-Diversity in PA Admissions, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions);
	• Focus group protocol-Diversity in PA Admissions, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions);

The IRB approved the protocol from 11/29/2018 to inclusive. Three weeks before you are to submit a completed Continuing Review application and required attachments to request continuing approval or closure.

If continuing review approval is not granted before the expiration date of approval of this protocol expires on that date. When consent is appropriate, you must use final, watermarked versions available under the "Documents" tab in ERA-IRB.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

IRB Administrator

cc: Bettie Coplan
        Bettie Coplan
        Bronwynne Evans

APPENDIX M

IRB APPROVAL B MANUSCRIPT 3

To: Bettie Coplan, MPAS, PA-C
From: NAU IRB Office
Date: December 14, 2018

Project: How Physician Assistant (PA) Programs Successfully Promote
Diversity in Admissions
Project Number: 1358389-1
Submission: Other
Review Level: Ceded Review
Action: APPROVED
Project Status: Active - Open to Enrollment
Next Report Date:

Institution Designated the IRB of Record: When an institution is the designated IRB of record, the NAU IRB will not review the project. Northern Arizona University agrees that it will rely on the review, approval, and continuing oversight by the institution IRB of those protocols approved by the institution pursuant to the terms of the Institutional Review Board Authorization Agreement.

- Northern Arizona University maintains a Federalwide Assurance with the Office for Human Research Protections (FWA #0000357).
- The Principal Investigator should notify the IRB immediately of any proposed changes that affect the LOCAL protocol and report any LOCAL unanticipated problems involving risks to participants or others. Please refer to Guidance Ceded IRB Review for more information.
- All research procedures should be conducted according to the approved protocol and the policies and guidance of the IRB of record.

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

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