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Integrating interprofessional experience throughout a first-year physician assistant curriculum improves perceptions of health care providers



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ABSTRACT

Purpose: Interprofessional collaboration is essential in Physician Assistant (PA) practice. Therefore, a three-semester sequence of Hospital Community Experience (HCE) was implemented during the didactic phase of the PA program providing students with weekly opportunities to shadow/observe health care professions.

Methods: This longitudinal, cohort study evaluated the effect of the HCE on PA students' perceptions of other health care professions prior to HCE, immediately after HCE, and one year later, after the clinical clerkships. The Interprofessional Perception Scale (IPS) survey was used to assess perceptions.

Results: Comparison of the IPS between the Pre-HCE and subsequent time points revealed statistically significant positive change in perception of other health care professions while also identified some areas for future research and curricular intervention. The greatest number of statistically significant changes occurred in statements which related to how other professions viewed the PA profession and how other professions worked with PAs.

Conclusion: The interprofessional HCEs emerged to be important in shaping the desired interprofessional professional identity of PA students.

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Introduction

Collaboration and teamwork among health professionals are important components for providing high-quality patient care. For health care providers to function effectively and efficiently on an interprofessional team, each member of the team must be trained in this model of approach.¹ As outlined in a milestone report by the Institute of Medicine (Educating for the Health Team 1972), preparations of the health care workforce should include interprofessional education (IPE), both in the classroom as well as in clinical care settings.² Recently, such training has shifted from the health care workplaces to educational institutions.^{3,4} Yet, as highlighted by a later report by the Institute of Medicine and the Pew Health Professions Commission, students are inadequately prepared to provide comprehensive interdisciplinary care, and thus are limited at meeting the health needs of society.^{5,6}

Accordingly, there is substantial interest and momentum surrounding interprofessional education across the academic setting.^{7–9} Interprofessional education provides opportunity for health profession students to intentionally learn to impact future team-based quality care delivery through subsequent collaborative practice. As defined in the WHO *Framework for Action on Interprofessional Education & Collaborative Practice* in 2010 “interprofessional education is essential to the development of a ‘collaborative practice-ready’ health workforce, one in which staff work together to provide comprehensive services in a wide range of health-care settings”.¹⁰

The cornerstone of the PA practice is built on the foundation of the physician–physician assistant team which has evolved over the past 50 years in response to shortages in primary care providers, changes in health care needs of the population, as well as the value of the team-based model of care.¹¹ The accrediting body for physician assistant education has established a standard (B1.06) for accreditation which mandates that all physician assistant programs must prepare students to work collaboratively in interprofessional patient centered teams (<http://www.arc-pa.org/documents/Standards4theditionwithclarifyingchanges9.2014%20FNL.pdf>).

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The strong commitment of both professions to team practice is rooted in the belief that this approach supports efficient patient-centered healthcare. Both the American Academy of Family Physicians (AAFP) and American Academy of Physician Assistants (AAPA) share the joint statement, which encourages interprofessional education and interprofessional teams of health care professionals working together to provide patient centered care. AAFP and AAPA recognize that physicians and PAs share common objectives in providing team-based, patient-centered care and enhancing the health of patients and their communities. The development and implementation of the Patient-Centered Medical Home where PAs work alongside physicians and other health care providers to improve access to care and improved patient outcomes is just one example emphasizing the importance of training future PAs in interprofessional practice during their professional program.^{12–14}

A variety of approaches to interprofessional education currently exist in the academic setting. These approaches can involve didactic courses (elective or required), modules distributed throughout courses, simulation events with different health care profession students, or clinical placements.^{15–17} In this study, we developed and evaluated the effect of a three-semester sequence of courses designed to provide shadowing/observation of a variety of health care professionals. The courses are titled Hospital Community Experience (HCE), which require first year PA students to travel to different hospitals, laboratories, pharmacies, and other health care facilities on one designated morning of the week to learn about the different roles of health care providers. The goal of the shadowing experiences is to expose PA students during their educational program to a variety of healthcare providers and their roles to encourage a sense of belonging to, as well as identification with other professions. This approach will allow for the development of a dual identity by the students as compared to a uniprofessional identity, enabling a sense of belonging/closeness to their own profession, as well as the interprofessional community.¹⁸ The primary objective of this study was to evaluate the perceptions that PA students have of other health professions before HCE, immediately after HCE, and one year later, after the clinical clerkships. We hypothesize that there will be an increase in positive perception of other health care professionals in those areas where perception is not favorable.

Materials and methods

Curriculum description

The Grand Valley State University Physician Assistant Studies (PAS) program expanded its curriculum in 2011 to include a comprehensive IPE course series to promote interprofessionalism in both education and practice of PAs. This new curriculum is centered on a year-long Hospital Community Experience (HCE) course sequence that focuses on the interprofessional experience outside of the classroom. Each week students observed different health care professionals and engaged in observation-based learning. Every Wednesday morning from 9 am to 12 pm (earlier or later in that time block as required by the specific site) each student in the course visited a different site. The health care professionals observed by the PA students included: physical therapist (PT), respiratory therapist (RT), occupational therapist (OT), dietitian, pharmacist, primary care physician, physician assistant, nurse, nurse practitioner (NP), cardiologist, surgeon, endoscopist, foot specialist, hospice caregiver, and medical laboratory scientist (MLS). In addition, the students went to an advanced technology laboratory, which includes a flow cytometry, cytogenetics and molecular diagnostics department, as well as the regional laboratories, which comprise the clinical laboratories including blood bank, clinical microbiology, gross pathology room, and histology.

After each observation, the students were required to write a 300 word reflective statement. Furthermore, students were assigned to a client in a long term care (LTC) facility, whom they visited three times each semester for the entire three-course sequence. Each visit to the LTC was centered on a specific assignment that facilitated application of knowledge learned in the program, as well as provided opportunities for students to interact with and assess specific health care needs of a geriatric patient, which included how different health care providers met those needs.

Tools and data collection

Prior to instituting this study, approval by the institution's human subject review board was obtained. The Interprofessional Perception Scale (IPS) tool was used in this study.¹⁹ The IPS is a 15-item tool with a 2-point scale (agree/disagree), developed by Ducanis and Golin (1979) and later modified by Mariano et al (1989).^{19,20} The IPS survey examines how professionals view other health care providers, and assesses their perception. PA students were asked if they agreed or disagreed with 15 statements in regard to a variety of professionals in the health care field. Those professions included: dietitians, physical therapists (PT), nurses (registered nurses, advanced practice nurses), medical laboratory scientists (MLS), physicians, pharmacists, social workers, respiratory therapists (RT), and occupational therapists (OT). Similar to reported work using other interprofessional surveys, we divided the IPS statements into two subscales based on identified themes.²¹ Type A statements: Perception of other professions (statements such as: 'Are competent' or 'have a higher status than your profession') and Type B statements: Perception of other professions in relation to own profession (statements such as: Understand the capabilities of your own profession).

A list of statements within each of the two categories is identified in Table 1. In addition, within each Type A and Type B statements are both positive perception statements and negative perception statements (Table 1).

Procedure

Prior to the three-semester sequence of HCE, the IPS was administered via SurveyMonkey® (Pre-HCE; Fig. 1). During the subsequent three-semester sequence of HCE, students were assigned a variety of experiences with health care professionals. Preceding to the start of the HCE course sequence a master schedule

Table 1
Categories of statements in the IPS.

Type A statements: IPS statements related to the students perception of other health care professions	Type B statements: Statements related to the perceptions of the other health care professions in relationship to their profession
<p><i>Positive perception statements</i></p> <ol style="list-style-type: none"> 1. Are competent 2. Are highly concerned with the welfare of the patient 3. Are highly ethical 4. Are well trained 	<p><i>Positive perception statements</i></p> <ol style="list-style-type: none"> 1. Understand the capabilities of your profession 2. Fully utilize the capabilities of your profession 3. Have a good relation with your profession 4. Trust your professional judgment
<p><i>Negative perception statements</i></p> <ol style="list-style-type: none"> 1. Have very little autonomy 2. Are defensive about their professional role 	<p><i>Negative perception statements</i></p> <ol style="list-style-type: none"> 1. Sometimes encroach on your profession 2. Seldom ask your professional advice 3. Do not cooperate well with your profession 4. Expect too much of your profession

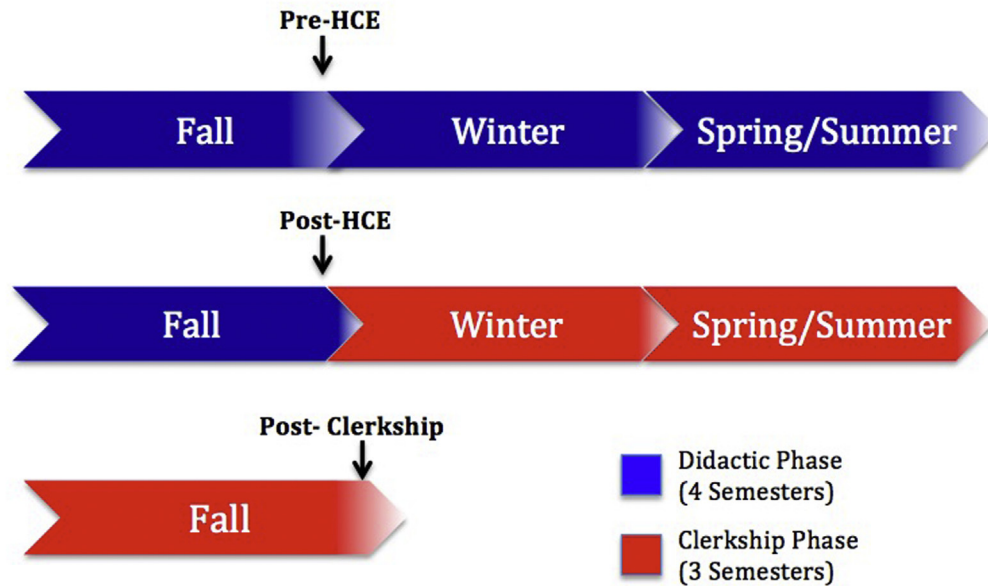


Fig. 1. Administration sequence of summative IPS survey. The summative IPS survey was administered at the three time points indicated by the arrows. Administration occurred prior to three semesters of HCE courses (Pre-HCE), after the HCE courses (Post-HCE) and after three semesters of clinical clerkship training (Post-Clerkship).

that included all three semesters was established to assure that each student has the opportunity to visit each observational site once. The observations were incorporated into the master schedule in no particular order, as the experiences did not build on each other. At the end of the three-semester sequence, the same survey (IPS) was given to all students in the program (Post-HCE; Fig. 1). Upon completion of the didactic phase of the PA program, students completed twelve months of clerkship/clinical rotations. At the end of the twelve months of clerkship/clinical rotations, the survey was given for the third time (Post-Clerkship; Fig. 1).

Statistics

The results of the analyses will be reported in relationship to the program's goal for the HCE courses, as well as the statistically significant perception changes that occurred. The program's goal was to have 85% or greater of the cohort of students respond with 'Agree' to the positive statements (e.g. 'Are Competent'), and 15% or less of the cohort respond with 'Agree' to the negative statements (e.g. 'Are Highly Unethical'). For those statements which did not achieve the program's goal of 85% or greater in the positive statements or 15% or less in the negative statements, the program determined that an improvement of 10% or greater at subsequent time points (Post-HCE and Post-Clerkship) would also be considered an acceptable change.

Analyses were performed in SAS 9.4 (SAS Institute, Cary, NC) using McNemar's test, since interest was in marginal frequencies of two dependent binary outcomes (Pre-HCE to Post-HCE, Pre-HCE to Post-Clerkships and Post-HCE to Post-Clerkships). For each of the questions, three hypothesis are considered, namely, question response (Yes/No) in Pre-HCE and question response (Yes/No) in Post-HCE are answered agree or disagree at the same rate (or that the contingency table is symmetric), question response (Yes/No) in Pre-HCE and question response (Yes/No) in Post-Clerkships are answered agree or disagree at the same rate (or that the contingency table is symmetric), and question response (Yes/No) in Post-HCE and question response (Yes/No) in Post-Clerkships are answered agree or disagree at the same rate (or that the contingency table is symmetric).

Results

Of the 43 students in the cohort, a total of 27 students (62% response rate) completed the IPS at all three time points.

Results of the Type A Positive statements

There were four Type A Positive statements for the nine different professions resulting in a total of 36 responses. Prior to HCE (Pre-HCE), only 11 of the 36 responses to the statements in the Type A Positive Perception Statements met the program target of 85% responding with "Agree." (Table 2). Those professions, which did not meet the 85% in the Pre-HCE survey to the statement "Are Competent" were nursing, MLS, pharmacist, social work, RT, and OT. At the subsequent time points of Post-HCE and Post-Clerkship, all professions showed improvement in their perception based on achievement of 85% or greater "Agree" response rate, with nursing and social work having statistically significant changes ($p = 0.03$, and $p = 0.016$, respectively). Professions not achieving the 85% or greater "Agree" response to the statement "Are highly concerned with the welfare of the patient" in the Pre-HCE were dietician, physical therapist, MLS, pharmacist, social worker, respiratory therapist and occupational therapist. However, there was improvement in the perception at subsequent time points for all professions except MLS which had a lower than 85% "Agree" response at the Post-HCE and Post-Clerkship time points. Although the MLS profession did not reach the program's target percentage (85%) there was a statistically significant change in the perception at the Post-Clerkship time point ($p = 0.039$). The only profession which had an 85% or greater "Agree" response rate to the statement "Are highly ethical" at the Pre-HCE was physician. At the Post-HCE and/or Post-Clerkship time points the other professions showed improvement in their perceptions with nursing having the only statistically significant improvement ($p = 0.0313$). Prior to HCE, the PA students perceived physicians, pharmacist, PT, and nurses as "Well Trained" based on an 85% or greater "Agree" response, but not dieticians, MLS, social workers, RT, and OT. All professions met the program's target of 85% or greater at both the Post-HCE and Post-Clerkship time points with perception of dieticians having the

Table 2
The percentage of physician assistant students who responded “Agree” to the Type A Positive Perception statements of the IPS.

	Are competent	Are highly concerned with the welfare of the patient	Are highly ethical	Are well trained
Dietician				
Pre-HCE	86%	82%	77%	74%
Post-HCE	100%	100%	91%	96%*
Post-Clerkship	100%	100%	82%	96%**
Physical therapist				
Pre-HCE	86%	82%	82%	85%
Post-HCE	100%	100%	91%	100%
Post-Clerkship	100%	100%	82%	100%
Nursing				
Pre-HCE	70%	89%	74%	85%
Post-HCE	96%*	100%	96%*	93%
Post-Clerkship	96%**	93%	82%	96%
MLS				
Pre-HCE	77%	44%	68%	78%
Post-HCE	95%	59%	82%	96%
Post-Clerkship	100%	70%**	73%	96%
Physician				
Pre-HCE	100%	95%	89%	100%
Post-HCE	100%	100%	100%	100%
Post-Clerkship	100%	95%	82%	100%
Pharmacist				
Pre-HCE	82%	77%	77%	86%
Post-HCE	100%	95%	95%	95%
Post-Clerkship	100%	100%	86%	100%
Social worker				
Pre-HCE	74%	82%	73%	74%
Post-HCE	96%*	95%	95%	93%*
Post-Clerkship	96%**	95%	82%	95%
Respiratory therapist				
Pre-HCE	77%	77%	73%	77%
Post-HCE	100%	95%	86%	95%
Post-Clerkship	95%	95%	82%	95%
Occupational therapist				
Pre-HCE	82%	82%	77%	86%
Post-HCE	95%	91%	86%	100%
Post-Clerkship	95%	95%	82%	95%

* Pre-HCE to Post-HCE significant at $p < 0.05$.
** Pre-HCE to Post-Clerkship significant at $p < 0.05$.

only statistically significant improvement ($p = 0.03$). In summary, 34 of the 36 statements in the Type A Positive Perception statements met the 85% or greater program target at completion of the three HCE courses, and 29 of the 36 responses met the program's target at the Post-Clerkship time point. Statistically significant changes after the HCE courses were found in the perception of nursing (“Are competent” and “Are highly ethical”), dietician (“Are Well Trained”), MLS (“Are highly concerned with the welfare of the patient.”), and social worker (“Are Competent” and “Are well trained”) (Table 2).

Results of the Type A Negative statements

There were two Type A Negative statements for the nine professions resulting in a total of 18 responses (Table 3). Pre-HCE results identified that the PA students perceived nursing, MLS, and RT as “Having very little autonomy” (Table 3). At the subsequent time points of Post-HCE and Post-Clerkship, this perception did not show statistical significant changes, and only nursing met the program's target of 10% improvement from baseline at subsequent time points. The Pre-HCE survey results showed that greater than 15% of the PA students perceived nursing, physicians, and pharmacist as “Defensive about their profession.” There was no statistically significant change in their responses to this statement at the

Table 3
The percentage of physician assistant students who responded “Agree” to the Type A Negative Perception statements of the IPS.

	Have very little autonomy	Are defensive about their professional role
Dietician		
Pre-HCE	14%	9%
Post-HCE	9%	0%
Post-Clerkship	18%	18%
Physical therapist		
Pre-HCE	0%	14%
Post-HCE	0%	5%
Post-Clerkship	9%	23%
Nursing		
Pre-HCE	59%	48%
Post-HCE	37%	26%
Post-Clerkship	48%	26%
MLS		
Pre-HCE	36%	5%
Post-HCE	36%	0%
Post-Clerkship	55%	5%
Physician		
Pre-HCE	9%	36%
Post-HCE	5%	36%
Post-Clerkship	9%	18%
Pharmacist		
Pre-HCE	14%	18%
Post-HCE	0%	18%
Post-Clerkship	23%	27%
Social worker		
Pre-HCE	9%	14%
Post-HCE	0%	5%
Post-Clerkship	18%	5%
Respiratory therapist		
Pre-HCE	18%	0%
Post-HCE	18%	0%
Post-Clerkship	18%	9%
Occupational therapist		
Pre-HCE	9%	0%
Post-HCE	9%	0%
Post-Clerkship	14%	9%

subsequent time points, Post-HCE or Post-Clerkship (Table 3). Nursing and physician met the program goal of 10% positive change from baseline to Post-HCE and/or Post-Clerkship. In summary, the two professions with the greatest response of “Agree” to the statement “Have Very Little Autonomy” were nursing and MLS, and this perception did not change over time. The professions that had the greatest response of “Agree” to the statement “Are defensive about their professions” were nursing, physician and pharmacist, with nursing and physician professions having a greater than 10% change in perception at the Post-Clerkship time point (Table 3).

Results of the Type B Positive statements

The Type B Statements of the IPS relate to the perceptions of the other health care professions in relationship to the PA profession. There were four Type B Positive statements for the nine professions resulting in a total of 36 responses. Prior to the HCE courses, the PA students met the program's goal of 85% or greater agreement in only 2 of the possible 36 responses (Table 4). Pre-HCE responses identified that PA students did not perceive any of the professions as “Understanding the capabilities of their profession,” or “Fully utilizing the capabilities of their profession.” In subsequent time points, there was a significant change in the statement “Understand the capabilities of their profession” for the professions of nursing, MLS, and social work ($p < 0.05$). Statistically significant changes in perception to the statement “Fully utilize the capabilities of their profession” occurred with the professions of dietician, PT, nursing, MLS, pharmacist, social worker, and RT ($p < 0.05$) from Pre-HCE to

Table 4

The percentage of physician assistant students who responded "Agree" to the Type B Positive Perception statements of the IPS.

	Understand the capabilities of your profession	Trust your professional judgment	Fully utilize the capabilities of your profession	Have good relations with your profession
Dietician				
Pre-HCE	45%	67%	22%	77%
Post-HCE	68%	89%	48%	86%
Post-Clerkship	73%	96%**	63%**	95%
Physical therapist				
Pre-HCE	59%	67%	26%	77%
Post-HCE	73%	93%*	48%	91%
Post-Clerkship	73%	96%**	67%**	95%
Nursing				
Pre-HCE	59%	67%	41%	74%
Post-HCE	78%	89%*	59%	93%
Post-Clerkship	85%**	100%**	78%**	93%
MLS				
Pre-HCE	26%	63%	26%	67%
Post-HCE	52%*	74%	26%	82%
Post-Clerkship	63%**	96%**	59%**	96%**
Physician				
Pre-HCE	82%	86%	73%	100%
Post-HCE	91%	95%	86%	100%
Post-Clerkship	91%	95%	85%	100%
Pharmacist				
Pre-HCE	59%	64%	30%	82%
Post-HCE	68%	82%	48%	95%
Post-Clerkship	73%	86%	70%**	95%
Social worker				
Pre-HCE	30%	67%	30%	73%
Post-HCE	56%	82%	30%	91%
Post-Clerkship	78%**	96%**	67%**	95%
Respiratory therapist				
Pre-HCE	50%	63%	22%	82%
Post-HCE	68%	89%*	44%	91%
Post-Clerkship	73%	93%**	63%**	95%
Occupational therapist				
Pre-HCE	52%	68%	22%	73%
Post-HCE	59%	77%	37%	91%
Post-Clerkship	78%	91%	52%	95%

* Pre-HCE to Post-HCE significant at $p < 0.05$.

** Pre-HCE to Post-Clerkship significant at $p < 0.05$.

Post-Clerkship. In addition, in the Pre-HCE survey PA students perceived that only the physician "Trusted their professional judgment," and "Had good relations with their profession." Significantly, the Post-Clerkship time point showed a significant change in the perception for dietician, PT, nursing, MLS, social work, and RT ($p \leq 0.05$) to the statement "Trusted their professional judgment", and a significant change for MLS to the statement "Have good relations with their professions" ($p \leq 0.05$). In summary, out of the 34 statements that did not meet the 85% or greater "Agree" response rate Pre-HCE, 17 had a statistically significant change in perception at either the Post-HCE and/or Post-Clerkship time points (Table 4). The remaining 17 statements that were lower than the 85% threshold at baseline did show improvement in the perceptions, with some meeting the program goal of greater than 10% improvement of positive perception, but the change was not statistically significant.

Results of the Type B Negative statements

There were four Type B Negative statements for the nine professions resulting in a total of 36 responses. Responses to the four statements of the Type B Negative Perceptions prior to HCE identified that students perceived that dieticians, PT, MLS, physicians, pharmacists and social workers, "Seldom ask for their professional

Table 5

The percentage of physician assistant students who responded "Agree" to the Type B Negative Perception statements of the IPS.

	Sometimes encroach on your profession	Seldom ask your professional advice	Do not cooperate well with your profession	Expect too much of your profession
Dietician				
Pre-HCE	0%	27%	0%	0%
Post-HCE	0%	9%	0%	0%
Post-Clerkship	5%	23%	5%	5%
Physical therapist				
Pre-HCE	5%	18%	0%	0%
Post-HCE	0%	14%	0%	0%
Post-Clerkship	9%	23%	5%	5%
Nursing				
Pre-HCE	33%	11%	7%	11%
Post-HCE	11%	0%	0%	0%
Post-Clerkship	26%	7%	4%	4%
MLS				
Pre-HCE	0%	18%	0%	0%
Post-HCE	0%	27%	0%	0%
Post-Clerkship	5%	27%	5%	5%
Physician				
Pre-HCE	23%	36%	0%	9%
Post-HCE	36%	18%	0%	9%
Post-Clerkship	41%	23%	5%	14%
Pharmacist				
Pre-HCE	5%	36%	0%	0%
Post-HCE	5%	23%	0%	0%
Post-Clerkship	9%	14%	5%	14%
Social worker				
Pre-HCE	0%	18%	5%	0%
Post-HCE	0%	14%	0%	0%
Post-Clerkship	5%	14%	5%	5%
Respiratory therapist				
Pre-HCE	0%	14%	0%	0%
Post-HCE	0%	18%	0%	0%
Post-Clerkship	9%	18%	5%	5%
Occupational therapist				
Pre-HCE	5%	14%	0%	0%
Post-HCE	0%	23%	0%	0%
Post-Clerkship	5%	18%	5%	5%

advice" (Table 5). There were no statistically significant changes in these perceptions Post-HCE or Post-Clerkship. Prior to HCE, PA students perceived that both nurses and physicians encroach on their profession with no significant change at the time points of Post-HCE and Post-Clerkship. The other two Type B Negative statements ("Do not cooperate well with your profession" and "Expect too much of your profession") met the program's threshold of 15% or less at all three time points for all of the nine professions (Table 5).

Discussion

Our findings suggest that the implementation of a three semester sequence of courses designed to provide shadowing/observation of a variety of health care professionals is successful in improving the perception of other health care professionals by PA students. Importantly, a majority of these changes are maintained and improved upon for at least one year after completion of the course series. Effective and efficient work as a health care team requires a solid understanding of each professions role and commitment to patient care. The increased complexity of patient care, fast evolving technology, and an aging population that requires more care necessitates a team approach coordinating the delivery of health care. Effective health care now more than ever requires the coordination and communication between practitioners to facilitate and improve patient care. Interprofessional

education is an approach to meet the needs of this changing health care environment and to improve health care and health outcomes.²² The HCE course sequence is such an approach that sets the stage to facilitate interprofessional practice by allowing students to gain a greater understanding of the role and responsibilities of other health care professions, as well as their own role as part of the health care team.

In agreement with the studies discussed in Cooper et al, we find that the three-semester HCE course series positively influenced the students' perception of other health care professions. Specifically, our study shows that students perception of other health care professions in relationship to their own improved, indicating that students now perceive that other professions view PAs as competent, useful and important members of the health care team.²³ This is most clearly exemplified by examining the students' perception of nursing, MLS, as well as physicians before and after the HCE course series and clinical year. Prior to HCE (Pre-HCE), students perceived nursing as well as MLS as less 'competent', 'ethical', nor 'having autonomy', while physicians were perceived as 'competent', 'ethical', and 'having autonomy' (Tables 2 and 3). Furthermore, MLS was identified as not being 'highly concerned with the welfare of patients'. Following the HCE course series (Post-HCE) and clinical year (Post-Clerkship), students maintained their perception of physicians, and perceived nursing and MLS as more 'competent', 'highly concerned with the welfare of the patient', and 'ethical'. Exposure to the MLS profession during the shadowing experience at a clinical laboratory has provided a better understanding of the role and significance of this profession as part of the health care team. This experience is important as the role of the MLS in the healthcare setting is changing as well. Once thought to be solely focused on the generation of health information with minimal patient as well as healthcare worker interaction, the MLS of today is becoming more visible in the health care setting with an increased focus on interpersonal communication and teamwork.²⁴ As for nursing and physicians, pre-HCE responses followed a stereotypical pattern, with nursing perceived as 'caring' but not 'competent', 'ethical' or 'having autonomy', while physicians are 'caring', 'competent', 'ethical' and 'have autonomy'. After observing the nursing profession throughout the HCE course series and being required to reflect on their role in the health care team, students perceived nursing as 'caring', 'competent', 'ethical' and 'have autonomy'. A study by Ward et al supports our findings in that the stereotypical image of the nursing profession as powerless and dependent on doctors is highly influenced by its depiction in the media, and that the perceived status of nurses within the hospital and community setting differs compared to other health care providers.²⁵ Nurses are trusted and described as caring, but are not seen as an integral part of critical patient care decisions and their job accomplishments are often not well acknowledged by co-professionals.^{26,27} As students observe nursing as part of the health care team, the nursing professions image changed from bedside providers to independent decision makers.

As mentioned above, the three semester course series in conjunction with the clinical year had a positive impact on how PAs perceive other health care professions in relationship to their own profession (Type B statements). All positive Type B responses improved, with 17 showing a statistically significant change Pre-HCE to Post-HCE and/or Post-Clerkship (Tables 4 and 5). These results suggest that the opportunity to observe different health care professions in their respective environments allows for a more realistic evaluation of professional interactions, and in turn informs and challenges existing beliefs and prevents stereotyping. A greater understanding of the scope of practice and the opportunity to interact with other health care providers leads to the promotion of

'interprofessional cultural competence', resulting in professionals that are more comfortable and skilled in working across professions.²⁸ Training health care providers in isolation creates *profession-centric* providers with limited *interprofessional cultural competence*.²⁰ Interestingly, about 75% of the negative Type B responses met the program target Pre-HCE, increasing to 85% Post-HCE. Again, nursing, MLS, and physicians stood out, with both nursing and physicians perceived to 'sometimes encroach on your profession' and MLS as well as physicians 'seldom ask your professional advice'. This result is not surprising for nursing and physicians, as their scope of practice overlaps with that of a PA. Educating the respective professions about the others scope of practice and capabilities will positively impact their ability to work together effectively as well as efficiently. The highly technical and specialized nature of the MLS profession on the other hand does limit the interaction of the professions, a status quo that is starting to change as discussed above.

We found that the students perception of other healthcare professions changes for a small number of Type A Statements (students perception of other health care professions) and even fewer Type B Statements (perception of the other health care profession in relationship to their profession) one year after HCE (upon completion of their clinical year in the program; post-clerkship). The most striking change was observed for 'are highly ethical', where fewer students agreed with the statement for all professions evaluated, including physicians Post-Clerkship (Table 2). One possible explanation for this finding is that students hold a notion of ethical behavior, instilled by social norms, as well as classroom discussions and exposure that is not compatible with actual medical practice. An example would be the denial of the perceived 'better treatment' option to a patient due to cost or the 'cutting of corners' to provide a more efficient work flow. It is possible that lack of experience and clinical competence of the students at this point of their training does not allow them to adequately evaluate certain clinical decisions in relationship to patient care and clinical outcome.

With regard to the Type B Statements, most (all for the Type B Positive statements, Table 4) students met the program target after their clinical year in the program. The clinical experience has solidified the greater understanding of other health care professions, further promoting the *interprofessional cultural competence*.

Several limitations exist in this study. First, the IPS survey tool used relies on yes and no answers, which have the potential to build bias into the question. A student is more likely to answer 'yes' as it is the more agreeable choice. Furthermore, the sample was convenient in nature, which limits the generalizability of the study results. Another limitation is the small sample size. Although a response rate of 62% was achieved, only a total of 29 students participated in the study, reducing its statistical power.

In summary, the results of this study suggest that implementation of the three semester HCE sequence of courses was successful in improving the perception of other health care professionals by PA students. Significantly, participation by PA students in the HCE course series lessened negative professional biases held towards professions such as nursing and MLS. The weekly half-day observational experiences can be integrated into a health profession curriculum and provide a unique and valued opportunity to incorporate interprofessional education into the didactic phase. Clinical sites and preceptors are willing to accommodate these observational experiences, as the experiences are brief and present little disruption to the workflow, yet allow for great teaching opportunities.

Future areas of research lie in longitudinal studies of the students who have been exposed to this model of interprofessional education. These studies will examine the roles these students

play in the health care system, the behaviors they exhibit while working with other providers, and ultimately the outcomes of the patients under their care. PAs educated in interprofessional practice are in a unique position to make a difference in the health care arena as the PA profession is founded on the principles of collaborative teamwork.

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